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Foreword

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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1 Scope

The present document specifies requirements for support of Radio Resource Management for the FDD and TDD modes of Evolved UTRA. These requirements include requirements on measurements in UTRAN and the UE as well as requirements on node dynamical behaviour and interaction, in terms of delay and response characteristics.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode"

[2] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) protocol specification".

[3] 3GPP TS 36.213: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures"

[4] 3GPP TS 36.214: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer; Measurements"

[5] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception"

[6] 3GPP TS 25.302: "Services provided by the Physical Layer".

[7] 3GPP TS 25.331: "RRC Protocol Specification".

[8] 3GPP TS 45.008: "Radio subsystem link control".

[9] 3GPP TS 45.005: "Radio transmission and reception".

[10] 3GPP TS 45.010: "Radio subsystem synchronization".

[11] 3GPP2 C.S0024-B: “cdma2000 High Rate Packet Data Air Interface Specification”.

[12] 3GPP2 C.S0002-D: “Physical Layer Standard for cdma2000 Spread Spectrum Systems – Release A”.

[13] 3GPP2 C.S0033-B: “Recommended Minimum Performance Standards for cdma2000 High Rate Packet Data Access Terminal”.

[14] 3GPP2 C.S0011-C: “Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations”.

[15] 3GPP2 C.S0005-D: Upper Layer (Layer 3) Signaling Specification for cdma2000 Spread Spectrum Systems

[16] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation”

[17] 3GPP TS 36.321: “Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification”.

[18] 3GPP TS 25.133: "Requirements for Support of Radio Resource Management (FDD)".

[19] 3GPP TS 25.123: "Requirements for Support of Radio Resource Management (TDD)".

[20] 3GPP TS 25.214: "Physical layer procedures (FDD)".

[21] 3GPP TS 36. 212: “Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding”.

[22] 3GPP TS 36.302: "Evolved Universal Terrestrial Radio Access (E-UTRA); Services provided by the physical layer"

[23] 3GPP TS 36.521-3: “Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Radio Resource Management conformance testing”.

[24] 3GPP TS 36.300: “Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2”

[25] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2"

[26] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [26] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [26].

3.2 Symbols

For the purposes of the present document, the following symbols apply:

[…]	Values included in square bracket must be considered for further studies, because it means that a decision about that value was not taken.
$BW_{Channel}$	Channel bandwidth, defined in TS 36.101 subclause 3.2
CPICH_Ec	Average energy per PN chip for the CPICH
CPICH_Ec/Io	The ratio of the received energy per PN chip for the CPICH to the total received power spectral density at the UE antenna connector.
Ec	Average energy per PN chip.
Ês	Received energy per RE (power normalized to the subcarrier spacing) during the useful part of the symbol, i.e. excluding the cyclic prefix, at the UE antenna connector
Io	The total received power density, including signal and interference, as measured at the UE antenna connector.
Ioc	The power spectral density (integrated in a noise bandwidth equal to the chip rate and normalized to the chip rate) of a band limited noise source (simulating interference from cells, which are not defined in a test procedure) as measured at the UE antenna connector.
Iot	The received power spectral density of the total noise and interference for a certain RE (power integrated over the RE and normalized to the subcarrier spacing) as measured at the UE antenna connector
N_{oc}	The power spectral density of a white noise source (average power per RE normalised to the subcarrier spacing), simulating interference from cells that are not defined in a test procedure, as measured at the UE antenna connector

n_{PRB}	Physical Resource Block number as defined in subclause 3.1 in 3GPP TS 36.211.
P_{CMAX}	Configured UE transmitted power as defined in subclause 6.2.5 in 3GPP TS 36.101.
S	Defined in TS 36.304, subclause 5.2.3.2 for E-UTRAN
SCH_Ec/Ior	The ratio of the transmit energy per PN chip of the SCH to the total transmit power spectral density at the UTRA Node B antenna connector
SCH_RP	Received (linear) average power of the resource elements that carry E-UTRA synchronisation signal, measured at the UE antenna connector
$S_{\text{ServingCcell}}$	Defined in TS 36.304
Sintersearch	Defined in TS 25.304, subclause 5.2.6.1.5
Sintrasearch	Defined in TS 25.304, subclause 5.2.6.1.5 for UTRAN and in TS 36.304 , subclause 5.2.4.7 for E-UTRAN
Snonintrasearch	Defined in TS 36.304 , subclause 5.2.4.7
SsearchRAT	Defined in TS 25.304, subclause 5.2.6.1.5
$\text{Thresh}_{\text{x, high}}$	Defined in TS 36.304 , subclause 5.2.4.7
$\text{Thresh}_{\text{x, low}}$	Defined in TS 36.304 , subclause 5.2.4.7
$\text{Thresh}_{\text{serving, low}}$	Defined in TS 36.304 , subclause 5.2.4.7
$T_{\text{RE-ESTABLISH-REQ}}$	The RRC Re-establishment delay requirement, the time between the moment when erroneous CRCs are applied, to when the UE starts to send preambles on the PRACH.
Treselection	Defined in TS 25.304, subclause 5.2.6.1.5
$\text{Treselection}_{\text{RAT}}$	Defined in TS 36.304 , subclause 5.2.4.7
$\text{Treselection}_{\text{EUTRAN}}$	Defined in TS 36.304 , subclause 5.2.4.7
$\text{Treselection}_{\text{UTRAN}}$	Defined in TS 36.304 , subclause 5.2.4.7
$\text{Treselection}_{\text{GERAN}}$	Defined in TS 36.304 , subclause 5.2.4.7
T_S	Basic time unit, defined in TS 36.211, clause 4

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [x] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [x].

1x RTT	CDMA2000 1x Radio Transmission Technology
ARQ	Automatic Repeat Request
AWGN	Additive White Gaussian Noise
BCCH	Broadcast Control Channel
BCH	Broadcast Channel
CCCH SDU	Common Control Channel SDU
CPICH	Common Pilot Channel
CPICH Ec/No	CPICH Received energy per chip divided by the power density in the band
C-RNTI	Cell RNTI
DCCH	Dedicated Control Channel
DL	Downlink
DRX	Discontinuous Reception
DTCH	Dedicated Traffic Channel
DUT	Device Under Test
eNB	E-UTRAN NodeB
E-UTRA	Evolved UTRA
E-UTRAN	Evolved UTRAN
FDD	Frequency Division Duplex
GERAN	GSM EDGE Radio Access Network
GSM	Global System for Mobile communication
HARQ	Hybrid Automatic Repeat Request
HO	Handover
HRPD	High Rate Packet Data
MAC	Medium Access Control

OCNG	OFDMA Channel Noise Generator
OFDM	Orthogonal Frequency Division Multiplexing
OFDMA	Orthogonal Frequency Division Multiple Access
PBCH	Physical Broadcast Channel
P-CCPCH	Primary Common Control Physical Channel
PCFICH	Physical Control Format Indicator CHannel
PDCCH	Physical Downlink Control CHannel
PDSCH	Physical Downlink Shared CHannel
PHICH	Physical Hybrid-ARQ Indicator CHannel
PLMN	Public Land Mobile Network
PRACH	Physical Random Access CHannel
PUCCH	Physical Uplink Control CHannel
PUSCH	Physical Uplink Shared Channel
RSCP	Received Signal Code Power
RSRP	Reference Signal Received Power
RSRQ	Reference Signal Received Quality
RSSI	Received Signal Strength Indicator
QAM	Quadrature Amplitude Modulation
RACH	Random Access Channel
RAT	Radio Access Technology
RNC	Radio Network Controller
RNTI	Radio Network Temporary Identifier
RRC	Radio Resource Control
RRM	Radio Resource Management
SCH	Synchronization Channel
SDU	Service Data Unit
SFN	System Frame Number
SON	Self Optimized Network
TDD	Time Division Duplex
TTI	Transmission Time Interval
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunication System
UTRA	Universal Terrestrial Radio Access
UTRAN	Universal Terrestrial Radio Access Network

3.4 Test tolerances

The requirements given in the present document make no allowance for measurement uncertainty. The test specification 36.521-3 [23] defines the test tolerances. These test tolerances are individually calculated for each test. The test tolerances are then added to the limits in this specification to create test limits. The measurement results are compared against the test limits as defined by the shared risk principle.

Shared Risk is defined in [ETR 273 Part 1 sub-part 2 section 6.5].

4 E-UTRAN RRC_IDLE state mobility

4.1 Cell Selection

After a UE has switched on and a PLMN has been selected, the Cell selection process takes place, as described in TS36.304. This process allows the UE to select a suitable cell where to camp on in order to access available services. In this process the UE can use stored information (*Stored information cell selection*) or not (*Initial cell selection*).

4.2 Cell Re-selection

4.2.1 Introduction

The cell reselection procedure allows the UE to select a more suitable cell and camp on it.

When the UE is in either *Camped Normally* state or *Camped on Any Cell* state on a cell, the UE shall attempt to detect, synchronise, and monitor intra-frequency, inter-frequency and inter-RAT cells indicated by the serving cell. For intra-frequency and inter-frequency cells the serving cell may not provide explicit neighbour list but carrier frequency information and bandwidth information only. UE measurement activity is also controlled by measurement rules defined in TS36.304, allowing the UE to limit its measurement activity.

4.2.2 Requirements

[Editor's Note: Requirements for multiple Tx antennas are still FFS. So far only 1Tx antenna case has been considered.The number of Tx antennas and possibly CP length may need to be provided per frequency layer. Details are FFS. Low mobility and high mobility requirements are still FFS]

The UE shall search every layer of higher priority at least every $T_{higher\_priority\_search} = (60 * N_{layers})$ seconds, where N_{layers} is the total number of configured higher priority E-UTRA, UTRA FDD, UTRA TDD, CDMA2000 1x and HRPD carrier frequencies and is additionally increased by one if one or more groups of GSM frequencies is configured as a higher priority.

Editors note: The measurement of cells that are detected in this search is still to be described.

4.2.2.1 Measurement and evaluation of serving cell

The UE shall measure the RSRP level of the serving cell and evaluate the cell selection criterion S defined in [1] for the serving cell at least every DRX cycle.

The UE shall filter the RSRP measurements of the serving cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by, at least DRX cycle/2.

If the UE has evaluated in N_{serv} consecutive DRX cycles that the serving cell does not fulfil the cell selection criterion S, the UE shall initiate the measurements of all neighbour cells indicated by the serving cell, regardless of the measurement rules currently limiting UE measurement activities.

If the UE in RRC_IDLE has not found any new suitable cell based on searches and measurements using the intra-frequency, inter-frequency and inter-RAT information indicated in the system information for 10 s, the UE shall initiate cell selection procedures for the selected PLMN as defined in [1].

Table 4.2.2.1-1: N_{serv}

DRX cycle length [s]	N_{serv} [number of DRX cycles]
0.32	4
0.64	4
1.28	2
2.56	2

4.2.2.2 Void

4.2.2.3 Measurements of intra-frequency E-UTRAN cells

The UE shall be able to identify new intra-frequency cells and perform RSRP measurements of identified intra-frequency cells without an explicit intra-frequency neighbour list containing physical layer cell identities.

The UE shall be able to evaluate whether a newly detectable intra-frequency cell meets the reselection criteria defined in TS36.304 within $T_{detect,EUTRAN\_Intra}$ when that Treselection= 0 . An intra frequency cell is considered to be detectable if:

- $RSRP|_{dBm} \geq$ -124 dBm for Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40 and RSRP Ês/Iot ≥ -4 dB,
- $RSRP|_{dBm} \geq$ -123 dBm for Bands 9 and RSRP Ês/Iot ≥ -4 dB,
- $RSRP|_{dBm} \geq$ -122 dBm for Bands 2, 5, 7 and RSRP Ês/Iot ≥ -4 dB,
- $RSRP|_{dBm} \geq$ -121 dBm for Bands 3, 8, 12, 13, 14, 17 and RSRP Ês/Iot ≥ -4 dB,
- $SCH\_RP|_{dBm} \geq$ -124 dBm for Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP|_{dBm} \geq$-123 dBm for Band 9 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP|_{dBm} \geq$ -122 dBm for Bands 2, 5, 7 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP|_{dBm} \geq$ -121 dBm for Bands 3, 8, 12, 13, 14, 17 and SCH Ês/Iot ≥ -4 dB.

The UE shall measure RSRP at least every $T_{measure,EUTRAN\_Intra}$ (see table 4.2.2.3-1) for intra-frequency cells that are identified and measured according to the measurement rules.

The UE shall filter RSRP measurements of each measured intra-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,EUTRAN\_Intra}/2$

The UE shall not consider a E-UTRA neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an intra-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the intra-frequency cell has met reselection criterion defined [1] within $T_{evaluate,E-UTRAN\_intra}$ when $T_{reselection} = 0$ as specified in table 4.2.2.3-1 provided that the cell is at least 3dB better ranked. When evaluating cells for reselection, the side conditions for RSRP and SCH apply to both serving and non-serving intra-frequency cells.

If $T_{reselection}$ timer has a non zero value and the intra-frequency cell is better ranked than the serving cell, the UE shall evaluate this intra-frequency cell for the $T_{reselection}$ time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

Table 4.2.2.3-1 : $T_{detect,EUTRAN\_Intra}$, $T_{measure,EUTRAN\_Intra}$ and $T_{evaluate, E-UTRAN\_intra}$

DRX cycle length [s]	$T_{detect,EUTRAN\_Intra}$ [s] (number of DRX cycles)	$T_{measure,EUTRAN\_Intra}$ [s] (number of DRX cycles)	$T_{evaluate,E-UTRAN\_intra}$ [s] (number of DRX cycles)
0.32	11.52 (36)	1.28 (4)	5.12 (16)
0.64	17.92 (28)	1.28 (2)	5.12 (8)
1.28	32(25)	1.28 (1)	6.4 (5)
2.56	58.88 (23)	2.56 (1)	7.68 (3)

4.2.2.4 Measurements of inter-frequency E-UTRAN cells

The UE shall be able to identify new inter-frequency cells and perform RSRP measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then the UE shall search for inter-frequency layers of higher priority at least every $T_{higher\_priority\_search}$ where $T_{higher\_priority\_search}$ is described in section 4.2.2.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority layers shall be the same as that defined below.

The UE shall be able to evaluate whether a newly detectable inter-frequency cell meets the reselection criteria defined in TS36.304 within $K_{carrier}$ * $T_{detect,EUTRAN\_Inter}$ if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when $T_{reselection}$ = 0 provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for reselections based on absolute priorities. The parameter $K_{carrier}$ is the number of E-UTRA inter-frequency carriers indicated by the serving cell. An inter-frequency cell is considered to be detectable if:

- $RSRP|_{dBm}$ ≥ -124 dBm for Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40 and RSRP Ês/Iot ≥ -4 dB,
- $RSRP|_{dBm}$≥ -123 dBm for Bands 9 and RSRP Ês/Iot ≥ -4 dB,
- $RSRP|_{dBm}$≥ -122 dBm for Bands 2, 5, 7 and RSRP Ês/Iot ≥ -4 dB,
- $RSRP|_{dBm}$≥ -121 dBm for Bands 3, 8, 12, 13, 14, 17 and RSRP Ês/Iot ≥ -4 dB,
- $SCH\_RP|_{dBm}$ ≥ -124 dBm for Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP|_{dBm}$≥-123 dBm for Band 9 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP\ |_{dBm}$≥ -122 dBm for Bands 2, 5, 7 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP\ |_{dBm}$≥ -121 dBm for Bands 3, 8, 12, 13, 14, 17 and SCH Ês/Iot ≥ -4 dB.

When higher priority cells are found by the higher priority search, they shall be measured at least every $T_{measure,E-UTRAN\_Inter}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall measure RSRP at least every $K_{carrier}$ * $T_{measure,EUTRAN\_Inter}$ (see table 4.2.2.4-1) for identified lower or equal priority inter-frequency cells. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall filter RSRP measurements of each measured higher, lower and equal priority inter-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,EUTRAN\_Inter}/2$.

The UE shall not consider a E-UTRA neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an inter-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell has met reselection criterion defined TS 36.304 within $K_{carrier}$ * $T_{evaluate,E-UTRAN\_Inter}$ when $T_{reselection}$ = 0 as specified in table 4.2.2.4-1 provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for reselections based on absolute priorities. When evaluating cells for reselection, the side conditions for RSRP and SCH apply to both serving and inter-frequency cells.

If $T_{reselection}$ timer has a non zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the $T_{reselection}$ time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

Table 4.2.2.4-1 : $T_{detect,EUTRAN\_Inter}$, $T_{measure,EUTRAN\_Inter}$ and $T_{evaluate,E-UTRAN\_Inter}$

DRX cycle length [s]	$T_{detect,EUTRAN\_Inter}$ [s] (number of DRX cycles)	$T_{measure,EUTRAN\_Inter}$ [s] (number of DRX cycles)	$T_{evaluate,E-UTRAN\_Inter}$ [s] (number of DRX cycles)
0.32	11.52 (36)	1.28 (4)	5.12 (16)
0.64	17.92 (28)	1.28 (2)	5.12 (8)
1.28	32(25)	1.28 (1)	6.4 (5)
2.56	58.88 (23)	2.56 (1)	7.68 (3)

4.2.2.5 Measurements of inter-RAT cells

If the $S_{ServingCell}$of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then ythe UE shall search for inter-RAT layers of higher priority at least every $T_{higher\_priority\_search}$ where $T_{higher\_priority\_search}$ is described in section 4.2.2.

If the $S_{ServingCell}$of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$then the UE shall search for and measure inter-RAT layers of higher, lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority inter-RAT layers shall be the same as that defined below for lower priority RATs.

4.2.2.5.1 Measurements of UTRAN FDD cells

When the measurement rules indicate that UTRA FDD cells are to be measured, the UE shall measure CPICH Ec/Io and CPICH RSCP of detected UTRA FDD cells in the neighbour frequency list at the minimum measurement rate specified in this section. The parameter $N_{UTRA\_carrier}$ is the number of carriers used in the neighbour frequency list. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured UTRA FDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

The UE shall evaluate whether newly detectable UTRA FDD cells have met the reselection criteria in TS 36.304 within time ($N_{UTRA\_carrier}$) * $T_{detectUTRA\_FDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$ when $Treselection_{RAT}$ = 0 provided that the reselection criteria is met by a margin of at least 6dB.

Cells which have been detected shall be measured at least every ($N_{UTRA\_carrier}$) * $T_{measureUTRA\_FDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

When higher priority UTRA FDD cells are found by the higher priority search, they shall be measured at least every $T_{measure,UTRA\_FDD}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell.

For a cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA FDD cell has met reselection criterion defined in 3GPP TS 36.304 [1] within ($N_{UTRA\_carrier}$) * $T_{evaluateUTRA\_FDD}$ when $T_{reselection}$ = 0 as speficied in table 4.2.2.5.1-1 provided that the reselection criteria is met by a margin of at least 6dB.

Table 4.2.2.5.1-1: $T_{detectUTRA\_FDD}$, $T_{measureUTRA\_FDD}$, and $T_{evaluateUTRA\_FDD}$

DRX cycle length [s]	$T_{detectUTRA\_FDD}$ [s]	$T_{measureUTRA\_FDD}$ [s] (number of DRX cycles)	$T_{evaluateUTRA\_FDD}$ [s] (number of DRX cycles)
0.32	30	5.12 (16)	15.36 (48)
0.64		5.12 (8)	15.36 (24)
1.28		6.4(5)	19.2 (15)
2.56	60	7.68 (3)	23.04 (9)

4.2.2.5.2 Measurements of UTRAN TDD cells

When the measurement rules indicate that UTRA TDD cells are to be measured, the UE shall measure P-CCPCH RSCP of detected UTRA TDD cells in the neighbour frequency list at the minimum measurement rate specified in this section. The parameter $N_{UTRA\_carrier\_TDD}$ is the number of carriers in the neighbour frequency list. The UE shall filter P-CCPCH RSCP measurements of each measured UTRA TDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period. P-CCPCH RSCP of UTRAN TDD cells shall not be filtered over a longer period than that specified in table 4.2.2.5.2-1.

The UE shall evaluate whether newly detectable UTRA TDD cells have met the reselection criteria in TS 36.304 within time ($N_{UTRA\_carrier\_TDD}$) * $T_{detectUTRA\_TDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$ when $T_{reselection}$ = 0 provided that the reselection criteria is met by a margin of at least 6dB.

Cells which have been detected shall be measured at least every ($N_{UTRA\_carrier\_TDD}$) * $T_{measureUTRA\_TDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

When higher priority UTRA TDD cells are found by the higher priority search, they shall be measured at least every $T_{measure,UTRA\_TDD}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell.

For a cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA TDD cell has met reselection criterion defined in [1] within $N_{UTRA\_carrier\_TDD}$ *$T_{evaluateUTRA\_TDD}$ when $T_{reselection}$ = 0 as specified in table 4.2.2.5.2-1 provided that the reselection criteria is met by a margin of at least 6dB.

Table 4.2.2.5.2-1: $T_{detectUTRA\_TDD}$, $T_{measureUTRA\_TDD}$ and $T_{evaluateUTRA\_TDD}$

DRX cycle length [s]	$T_{detectUTRA\_TDD}$ [s]	$T_{measureUTRA\_TDD}$ [s] (number of DRX cycles)	$T_{evaluateUTRA\_TDD}$ [s] (number of DRX cycles)
0.32	30	5.12 (16)	15.36 (48)
0.64		5.12 (8)	15.36 (24)
1.28		6.4(5)	19.2 (15)
2.56	60	7.68 (3)	23.04 (9)

4.2.2.5.3 Measurements of GSM cells

When the measurement rules defined in [1] indicate that E-UTRAN inter-frequencies or inter-RAT frequency cells are to be measured, the UE shall measure the signal level of the GSM BCCH carriers if the GSM BCCH carriers are indicated in the measurement control system information of the serving cell. GSM BCCH carriers of lower priority than the serving cell shall be measured at least every $T_{measure,GSM}$ (see table 4.2.2.5.3-1).

When higher priority GSM BCCH carriers are found by the higher priority search, they shall be measured at least every $T_{measure,GSM,}$ and the UE shall decode the BSIC of the GSM BCCH carrier. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection, or to continuously verify the BSIC of the GSM BCCH carrier every 30s. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell.

The UE shall maintain a running average of 4 measurements for each GSM BCCH carrier. The measurement samples for each cell shall be as far as possible uniformly distributed over the averaging period.

If continuous GSM measurements are required by the measurement rules in [1], the UE shall attempt to verify the BSIC at least every 30 seconds for each of the 4 strongest GSM BCCH carriers. If a change of BSIC is detected for one GSM cell then that GSM BCCH carrier shall be treated as a new GSM neighbour cell. If the UE detects on a BCCH carrier a BSIC which is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform BSIC re-confirmation for that cell.

The UE shall not consider the GSM BCCH carrier in cell reselection, if the UE cannot demodulate the BSIC of that GSM BCCH carrier. Additionally, the UE shall not consider a GSM neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

Table 4.2.2.5.3-1: $T_{measure,GSM,}$

DRX cycle length [s]	$T_{measure,GSM}$ [s] (number of DRX cycles)
0.32	5.12 (16)
0.64	5.12 (8)
1.28	6.4(5)
2.56	7.68 (3)

4.2.2.5.4 Measurements of HRPD cells

In order to perform measurement and cell reselection to HRPD cell, the UE shall acquire the timing of HRPD cells.

If $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$, the UE shall search for CDMA2000 HRPD layers of higher priority at least every $T_{higher\_priority\_search}$ where $T_{higher\_priority\_search}$ is defined in section 4.2.2.

For CDMA2000 HRPD cells which have been detected, the UE shall measure CDMA2000 HRPD Pilot Strength at least every (Number of HRPD Neighbor Frequency)*$T_{measureHRPD}$, when the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$.

The UE shall be capable of evaluating that the CDMA2000 HRPD cell has met cell reselection criterion defined in [1] within $T_{evaluateHRPD}$.

Table 4.2.2.5.4-1 gives values of $T_{measureHRPD}$ and $T_{evaluateHRPD}$.

Table 4.2.2.5.4-1: $T_{measureHRPD}$ and $T_{evaluateHRPD}$

DRX cycle length [s]	$T_{measureHRPD}$ [s] (number of DRX cycles)	$T_{evaluateHRPD}$ [s] (number of DRX cycles)
0.32	5.12 (16)	15.36 (48)
0.64	5.12 (8)	15.36 (24)
1.28	6.4 (5)	19.2 (15)
2.56	7.68 (3)	23.04 (9)

4.2.2.5.5 Measurements of cdma2000 1X

In order to perform measurement and cell reselection to cdma2000 1X cell, the UE shall acquire the timing of cdma2000 1X cells.

When the measurement rules indicate that cdma2000 1X cells are to be measured, the UE shall measure cdma2000 1x RTT Pilot Strength of cdma2000 1X cells in the neighbour cell list at the minimum measurement rate specified in this section.

The parameter 'Number of CDMA2000 1X Neighbor Frequency', which is transmitted on E-UTRAN BCCH, is the number of carriers used for all cdma2000 1X cells in the neighbour cell list.

If $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$, the UE shall search for cdma2000 1X layers of higher priority at least every $T_{higher\_priority\_search}$ where $T_{higher\_priority\_search}$ is defined in section 4.2.2.

For CDMA2000 1X cells which have been detected, the UE shall measure CDMA2000 1xRTT Pilot Strength at least every (Number of CDMA2000 1X Neighbor Frequency)*$T_{measureCDMA2000\_1X}$, when the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$.

The UE shall be capable of evaluating that the cdma2000 1X cell has met cell reselection criterion defined in [1] within $T_{evaluateCDMA2000\_1X}$.

Table 4.2.2.5.5-1 gives values of $T_{measureCDMA2000\_1X}$ and $T_{evaluateCDMA2000\_1X}$.

Table 4.2.2.5.5-1: $T_{measureCDMA2000\ 1X}$ and $T_{evaluateCDMA2000\ 1X}$

DRX cycle length [s]	$T_{measureCDMA2000\_1X}$ [s] (number of DRX cycles)	$T_{evaluateCDMA2000\_1X}$ [s] (number of DRX cycles)
0.32	5.12 (16)	15.36 (48)
0.64	5.12 (8)	15.36 (24)
1.28	6.4 (5)	19.2 (15)
2.56	7.68 (3)	23.04 (9)

4.2.2.6 Evaluation of cell re-selection criteria

The UE shall evaluate the intra-frequency, inter-frequency and inter-RAT cell reselection criteria defined in [1] at least every DRX cycle. When a non zero value of $T_{reselection}$ is used, the UE shall only perform reselection on an evaluation which occurs simultaneously to, or later than the expiry of the $T_{reselection}$ timer.

4.2.2.7 Maximum interruption in paging reception

UE shall perform the cell re-selection with minimum interruption in monitoring downlink channels for paging reception.

At intra-frequency and inter-frequency cell re-selection, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable to start monitoring downlink channels of the target intra-frequency and inter-frequency cell for paging reception. The interruption time shall not exceed $T_{SI\text{-}EUTRA}$ + 50 ms.

At inter-RAT cell re-selection, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable to start monitoring downlink channels for paging reception of the target inter-RAT cell. For E-UTRAN to UTRA cell re-selection the interruption time must not exceed $T_{SI\text{-}UTRA}$ + 50 ms. For E-UTRAN to GSM cell re-selection the interruption time must not exceed T_{BCCH} + 50 ms.

$T_{SI\text{-}EUTRA}$ is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in [2] for a E-UTRAN cell.

$T_{SI\text{-}UTRA}$ is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in [7] for a UTRAN cell.

T_{BCCH} is the maximum time allowed to read BCCH data from a GSM cell defined in [8].

These requirements assume sufficient radio conditions, so that decoding of system information can be made without errors and does not take into account cell re-selection failure.

At cell re-selection to HRPD, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable of starting to monitor downlink channels for paging reception of the target HRPD cell. For HRPD cell re-selection the interruption time must not exceed $T_{SI\text{-}HRPD}$ + 50 ms.

$T_{SI\text{-}HRPD}$ is the time required for receiving all the relevant system information data according to the reception procedure and the upper layer (Layer 3) procedure delay of system information blocks defined in [11] in for HRPD cell.

At cell re-selection to cdma2000 1X, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable of starting to monitor downlink channels for paging reception of the target cdma2000 1X cell. For cdma2000 1X cell re-selection the interruption time must not exceed $T_{SI\text{-}cdma2000\_1X}$ + 50 ms.

$T_{SI\text{-}cdma2000\_1X}$ is the time required for receiving all the relevant system information data according to the reception procedure and the upper layer (Layer 3) procedure delay of system information blocks defined in [15] for cdma2000 1X cell.

4.2.2.8 void

4.2.2.9 UE measurement capability

For idle mode cell re-selection purposes, the UE shall be capable of monitoring at least:

- Intra-frequency carrier, and
- Depending on UE capability, 3 FDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 3 TDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 3 FDD UTRA carriers, and
- Depending on UE capability, 3 TDD UTRA carriers, and

- Depending on UE capability, 32 GSM carriers, and
- Depending on UE capability, 3 cdma2000 1x carriers, and
- Depending on UE capability, 3 HRPD carriers.

In addition to the requirements defined above, a UE in RRC_IDLE state shall be capable of monitoring a total of at least 8 carrier frequency layers, which includes serving layer, comprising of any above defined combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD, GSM (one GSM layer corresponds to 32 cells) , cdma2000 1x and HRPD layers.

4.2.2.10 Reselection to CSG cells

Note: Requirements in this section are minimum requirements defined to ensure the testability of autonomous CSG search. Further information on autonomous search times in practical deployments is available in [25].

Reselection from non CSG to CSG cells may be performed using UE autonomous search as defined in [1] when at least one CSG ID is included in the UE's CSG whitelist. The requirements in this section are valid for reselection to CSG cells previously visited by the UE when the radio configuration parameters, including the carrier frequency and physical cell identity of the CSG cell, non CSG cell and other neighbour cells are unchanged from the most recent previous visit.

NOTE: The UE autonomous search function, per UE implementation, determines when and/or where to search for allowed CSG cells.

4.2.2.10.1 Reselection from a non CSG to an inter-frequency CSG cell

The UE shall perform search and reselection to an allowed inter-frequency CSG cell that has met CSG reselection criterion defined in [1] and that is in its whitelist, within 6 minutes in the conditions shown in table 4.2.2.10.1-1. There is no need for statistical testing of this requirement.

Table 4.2.2.10.1-1: Parameters for CSG inter-frequency reselection

Parameter	Unit	Cell 1	Cell 2
E-UARFCN Note1		Channel 1	Channel 2
CSG indicator		False	True
Physical cell identity Note1		1	2
CSG identity		Not sent	Sent (Already stored in UE whitelist from previous visit)
Propagation conditions		Static, non multipath	
CSG cell previously visited by UE		Yes	
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	*dB*		
SSS_RA	*dB*		
PCFICH_RB	*dB*		
PHICH_RA	dB		
PHICH_RB	dB	0	0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
Qrxlevmin	dBm	-140	-140
N_{oc}	dBm/15 kHz	Off	
RSRP Note2	dBm/15 KHz	[≥TBD]	[≥TBD]
Note 1: For this requirement to be applicable, the E-UARFCN and physical cell identity for cell 1 and cell 2 shall be unchanged from when the CSG cell was visited previously Note 2: Chosen to ensure that CSG autonomous search has a high probability of success on every attempt made by UE			

4.2.2.10.2 Reselection from a non CSG to an inter-RAT UTRAN FDD CSG cell

The UE shall perform search and reselection to an allowed inter-RAT UTRAN FDD CSG cell that has met CSG reselection criterion defined in [1] and that is in its whitelist, within 6 minutes in the conditions shown in table 4.2.2.10.2-1. There is no need for statistical testing of this requirement.

Table 4.2.2.10.2-1: Parameters for CSG inter-RAT UTRAN FDD reselection

Parameter	Unit	Cell 1	Cell 2
E-UARFCN Note1		Channel 1	N/A
UARFCN Note1		N/A	Channel 2
CSG indicator		False	True
Physical cell identity Note1		1	N/A
Primary scrambling code Note1		N/A	Scrambling code 2
CSG identity		Not sent	Sent (Already stored in UE whitelist from previous visit)
Propagation conditions		Static, non multipath	
CSG cell previously visited by UE		Yes	
PBCH_RA	dB	0	N/A
PBCH_RB	dB		
PSS_RA	*dB*		
SSS_RA	*dB*		
PCFICH_RB	*dB*		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
Qrxlevmin	dBm	-140	
N_{oc}	dBm/15 kHz	Off	
RSRP Note2	dBm/15 KHz	[≥TBD]	
CPICH_Ec Note2	dBm	N/A	[≥TBD]
CPICH_Ec/Ior	dB		-10
PCCPCH_Ec/Ior	dB		-12
SCCPCH_Ec/Ior	dB		-12
AICH_Ec/Ior	dB		-15
SCH_Ec/Ior	dB		-15
PICH_Ec/Ior	dB		-15
I_{oc}	dBm/3.84 MHz		Off
Note 1: For this requirement to be applicable, the E-UARFCN and physical cell identity for cell 1 and the UARFCN and scrambling code for cell 2 shall be unchanged from when the CSG cell was visited previously Note 2: Chosen to ensure that CSG autonomous search has a high probability of success on every attempt made by UE			

5 E-UTRAN RRC_CONNECTED state mobility

Note: For the performance requirements specified hereafter, the state when no DRX is used is defined as follows:

- DRX parameters are not configured; or
- DRX parameters are configured and
  - *drx-InactivityTimer* is running; or
  - *drx-RetransmissionTimer* is running; or
  - *mac-ContentionResolutionTimer* is running; or
  - a Scheduling Request sent on PUCCH is pending; or

- an uplink grant for a pending HARQ retransmission can occur and there is data in the corresponding HARQ buffer; or
- a PDCCH indicating a new transmission addressed to the C-RNTI of the UE has not been received after successful reception of a Random Access Response for the explicitly signaled preamble (only applicable to UEs in RRC_CONNECTED).

Otherwise

- It is the state when DRX is used.

5.1 E-UTRAN Handover

5.1.1 Introduction

5.1.2 Requirements

5.1.2.1 E-UTRAN FDD – FDD

The requirements in this section are applicable to both intra-frequency and inter-frequency handovers.

5.1.2.1.1 Handover delay

Procedure delays for all procedures that can command a handover are specified in [2].

When the UE receives a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

$D_{handover}$ equals the maximum RRC procedure delay to be defined in section 11.2 in 3GPP TS 36.331 [2] plus the interruption time stated in section 5.1.2.1.2.

5.1.2.1.2 Interruption time

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When intra-frequency or inter-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

Where:

T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then T_{search} = 0 ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then T_{search} = 80 ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times

T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. T_{IU} can be up to 30 ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in Section 8.1.2.2.1 for intra-frequency handover and Section 8.1.2.3.1 for inter-frequency handover.

5.2.2.2 E-UTRAN FDD – TDD

The requirements in this section are applicable to handover from FDD to TDD. The requirements in this section shall apply to UE supporting FDD and TDD.

The requirements in section 5.2.2.4 apply for this section.

5.2.2.2.1 (Void)

5.2.2.2.2 (Void)

5.2.2.3 E-UTRAN TDD – FDD

The requirements in this section are applicable to handover from TDD to FDD. The requirements in this section shall apply to UE supporting FDD and TDD.

The requirements in section 5.1.2.1 apply for this section.

5.2.2.3.1 (Void)

5.2.2.3.2 (Void)

5.2.2.4 E-UTRAN TDD – TDD

The requirements in this section are applicable to both intra-frequency and inter-frequency handovers.

5.2.2.4.1 Handover delay

Procedure delays for all procedures that can command a handover are specified in 3GPP TS 36.331 [2].

When the UE receives a RRC message implying handover, the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

$D_{handover}$ equals the maximum RRC procedure delay to be defined in section 11.2 in 3GPP TS36.331 [2] plus the interruption time stated in section 5. 2.2.4.2.

5.2.2.4.2 Interruption time

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When intra-frequency or inter-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

Where

T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then T_{search} = 0 ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then T_{search} = 80 ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. T_{IU} can be up to 30 ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in Section 8.1.2.2.2 for intra-frequency handover and Section 8.1.2.3.4 for inter-frequency handover.

5.3 Handover to other RATs

5.3.1 E-UTRAN - UTRAN FDD Handover

5.3.1.1 Introduction

The purpose of inter-RAT handover from E-UTRAN to UTRAN FDD is to change the radio access mode from E-UTRAN to UTRAN FDD. The handover procedure is initiated from E-UTRAN with a RRC message that implies a hard handover as described in [2].

5.3.1.1.1 Handover delay

When the UE receives a RRC message implying handover to UTRAN the UE shall be ready to start the transmission of the new UTRA uplink DPCCH within $D_{handover}$ seconds from the end of the last E-UTRAN TTI containing the RRC MOBILITY FROM E-UTRA command.

where:

- $D_{handover}$ equals the RRC procedure delay, which is 50 ms plus the interruption time stated in section 5.3.1.1.2.

5.3.1.1.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink DPCCH in UTRAN FDD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

The target cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. The UE shall always perform a UTRA synchronisation procedure as part of the handover procedure.

If the target cell is known the interruption time shall be less than $T_{interrupt1}$

$$T_{interrupt1} = T_{IU}+T_{sync}+50+ 10*F_{max} \text{ ms}$$

If the target cell is unknown the interruption time shall be less than $T_{interrupt2}$

$$T_{interrupt2} = T_{IU}+T_{sync}+150 + 10*F_{max} \text{ ms}$$

This requirement shall be met, provided that there is one target cell in the MOBILITY FROM E-UTRA command. Performance requirements for E-UTRA to UTRA soft handover are not specified. When UE is connected to an E-UTRA cell, UTRA SFN timing measurements are not reported. This implies that the timing of the DPCH of the UTRA target cells in the active set cannot be configured by UTRAN to guarantee that all target cells fall within the UE reception window of T_0 +/- 148 chips.

Where:

T_{IU} is the interruption uncertainty when changing the timing from the E-UTRAN to the new UTRAN cell. T_{IU} can be up to one UTRA frame (10 ms).

F_{max} denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH on the UTRA target cell.

T_{sync} is the time required for measuring the downlink DPCCH channel as stated in 3GPP TS 25.214 section 4.3.1.2 [20]. In case higher layers indicate the usage of a post-verification period T_{sync}=0 ms. Otherwise T_{sync}=40 ms.

The phase reference is the primary CPICH.

The requirements in this section assume that N312 has the smallest possible value i.e. only one insync is required.

5.3.2 E-UTRAN - UTRAN TDD Handover

5.3.2.1 Introduction

The purpose of inter-RAT handover from E-UTRAN to UTRAN TDD is to change the radio access mode from E-UTRAN to UTRAN TDD. The handover procedure is initiated from E-UTRAN with a RRC message that implies a hard handover as described in [2].

5.3.2.2 Requirements

The requirements in this section shall apply to UE supporting E-UTRAN and UTRAN TDD.

5.3.2.2.1 Handover delay

When the UE receives a RRC message implying E-UTRAN/UTRAN TDD handover the UE shall be ready to start the transmission of the new uplink DPCH or the SYNC-UL within $D_{handover}$ seconds from the end of the last TTI containing the RRC MOBILITY FROM E-UTRA command.

Where:

- $D_{handover}$ equals the RRC procedure delay, which is 50 ms plus the interruption time stated in section 5.3.2.2.

5.3.2.2.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink DPCH or the SYNC-UL in UTRAN TDD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

The UE shall always perform a UTRA synchronisation procedure as part of the handover procedure.

If the target cell has been measured by the UE during the last 5 seconds, the interruption time shall be less than $T_{interrupt1}$

$$T_{interrupt1} = T_{offset} + T_{UL} + 30*F_{SFN} + 20 + 10*F_{max} \text{ ms}$$

If the target cell has not been measured by the UE during the last 5 seconds, the interruption time shall be less than $T_{interrupt2}$

$$T_{interrupt2} = T_{offset} + T_{UL} + 30*F_{SFN} + 180 + 10*F_{max} \text{ ms}$$

Where:

T_{offset}	Equal to 10 ms, the frame timing uncertainty between the old cell and the target cell and the time that can elapse until the appearance of a Beacon channel
T_{UL}	Equal to 10 ms, the time that can elapse until the appearance of the UL timeslot in the target cell
F_{SFN}	Equal to 1 if SFN decoding is required and equal to 0 otherwise
F_{max}	denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

The interruption time requirements for an unknown target cell shall apply only if the signal quality of the unknown target cell is sufficient for successful synchronisation with one attempt.

5.3.3 E-UTRAN - GSM Handover

5.3.3.1 Introduction

The purpose of inter-RAT handover from E-UTRAN to GSM is to transfer a connection between the UE and E-UTRAN to GSM. The handover procedure is initiated from E-UTRAN with a RRC message (MOBILITY FROM E-UTRA). The procedure is described in in 3GPP TS 36.331 [2].

5.3.3.2 Requirements

The requirements in this section shall apply to UE supporting E-UTRAN and GSM.

The requirements given below in Tables 5.3.3.2.1-1 and 5.3.3.2.2-1 for the case where the UE has not synchronised to the GSM cell before receiving the RRC MOBILITY FROM E-UTRA command are valid when the signal quality of the GSM cell is sufficient for successful synchronisation with one attempt. If the UE is unable to synchronise to the GSM cell on the first attempt, it shall continue to search for synchronisation information for up to 800 ms duration. If after 800 ms the UE has not synchronised to the GSM cell it shall follow the handover failure procedure specified in [2].

5.3.3.2.1 Handover delay

When the UE receives a RRC MOBILITY FROM E-UTRA command the UE shall be ready to transmit (as specified in [10]) on the channel of the new RAT within the value in table 5.3.3.2.1-1 from the end of the last TTI containing the RRC command. The UE shall process the RRC procedures for the MOBILITY FROM E-UTRA command within 50 ms, which is noted as RRC procedure delay.

Table 5.3.3.2.1-1: E-UTRAN/GSM handover - handover delay

UE synchronisation status	handover delay [ms]
The UE has synchronised to the GSM cell before the RRC MOBILITY FROM E-UTRA COMMAND is received	90
The UE has not synchronised to the GSM cell before the RRC MOBILITY FROM E-UTRA COMMAND is received	190

5.3.3.2.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink channel in GSM, excluding the RRC procedure delay. The interruption time depends on whether the UE has synchronized to the target GSM cell or not and shall be less than the value specified in table 5.3.3.2.2-1.

Table 5.3.3.2.2-1: E-UTRAN/GSM handover - interruption time

Synchronisation status	Interruption time [ms]
The UE has synchronised to the GSM cell before the RRC MOBILITY FROM E-UTRA COMMAND is received	40
The UE has not synchronised to the GSM cell before the RRC MOBILITY FROM E-UTRA COMMAND is received	140

5.4 Handover to Non-3GPP RATs

5.4.1 E-UTRAN – HRPD Handover

5.4.1.1 Introduction

The handover procedure from E-UTRAN to HRPD is initiated when E-UTRAN sends handover command to the UE through dedicated RRC signalling.

5.4.1.1.1 Handover delay

The handover delay ($D_{handover}$) is defined as the sum of the RRC procedure delay, which is 50 ms and the interruption time specified in section 5.4.1.1.2.

When the UE receives a RRC message implying handover to HRPD, the UE shall be ready to start the transmission of the new reverse control channel in HRPD within $D_{handover}$ from the end of the last E-UTRAN TTI containing the RRC command.

5.4.1.1.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission of the reverse control channel in HRPD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

An HRPD cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. Under the reference conditions specified in sub-clause 6.6 of [13], the interruption time shall be less than $T_{interrupt}$

$$T_{interrupt} = T_{IU} + 40 + 10*KC*SW_K + 10*OC*SW_O \text{ ms}$$

Where:

T_{IU}	It is the interruption uncertainty when changing the timing from the E-UTRAN to the new HRPD cell. T_{IU} can be up to one HRPD frame (26.66 ms).
SW_K	is $SW_K = \left\lceil \frac{\text{srch\_win\_k}}{60} \right\rceil$ where srch_win_k is the number of HRPD chips indicated by the search window for known target HRPD cells in the message
SW_O	is $SW_O = \left\lceil \frac{\text{srch\_win\_o}}{60} \right\rceil$ where srch_win_o is the number of HRPD chips indicated by the search window for unknown target HRPD cells in the message
KC	It is the number of known target HRPD cells in the message, and
OC	It is the number of unknown target HRPD cells in the message.

Note: An additional delay in the interruption time may occur due to the reverse link silence interval [11], which is specific to HRPD.

5.4.2 E-UTRAN – cdma2000 1X Handover

5.4.2.1 Introduction

The handover procedure from E-UTRAN to cdma2000 1X is initiated when E-UTRAN sends handover command to the UE through dedicated RRC signalling.

5.4.2.1.1 Handover delay

The handover delay ($D_{handover}$) is defined as the sum of the RRC procedure delay, which is 130 ms and the interruption time specified in section 5.4.2.1.2.

When the UE receives a RRC message implying handover to cdma2000 1X, the UE shall be ready to start the transmission of the new reverse control channel in cdma2000 1X within $D_{handover}$ from the end of the last E-UTRAN TTI containing the RRC command.

5.4.2.1.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission of the reverse control channel in cdma2000 1X, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

A cdma2000 1X cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. Under the reference conditions specified in sub-clause 4.2.1 of [14], the interruption time shall be less than $T_{interrupt}$:

$$T_{interrupt} = T_{IU} + 40 + 10*KC*SW_K + 10*OC*SW_O \text{ ms}$$

Where:

T_{IU} It is the interruption uncertainty when changing the timing from the E-UTRAN to the new cdma2000 1X cell. T_{IU} can be up to one cdma2000 1X frame (20 ms).

SW_K is $SW_K = \left\lceil \frac{\text{srch\_win\_k}}{60} \right\rceil$ where srch_win_k is the number of cdma2000 1x chips indicated by the search window for known target cdma2000 1x cells in the message

SW_O is $SW_O = \left\lceil \frac{\text{srch\_win\_o}}{60} \right\rceil$ where srch_win_o is the number of cdma2000 1x chips indicated by the search window for unknown target cdma2000 1x cells in the message

KC It is the number of known target cdma2000 1X cells in the message, and

OC It is the number of unknown target cdma2000 1X cells in the message.

6 RRC Connection Mobility Control

6.1 RRC Re-establishment

The requirements in this section are applicable to both E-UTRAN FDD and TDD.

6.1.1 Introduction

RRC connection re-establishment is initiated when a UE in RRC connected mode looses RRC connection due to any of these reasons: radio link failure, handover failure or radio link problem. The RRC es-tablishment procedure is specified in section 5.3.7 in TS 36.331 [2].

6.1.2 Requirements

In RRC connected mode the UE shall be capable of sending *RRCConnectionReestablishmentRequest* message within $T_{re\text{-}establish\_delay}$ seconds from the moment it detects a loss in RRC connection. The total RRC connection delay ($T_{re\text{-}establish\_delay}$) shall be less than:

$$T_{re\text{-}establish\_delay} = T_{UL\_grant} + T_{UE\_re\text{-}establish\_delay}$$

T_{UL_grant}: It is the time required to acquire and process uplink grant from the target cell. The uplink grant is required to transmit *RRCConnectionReestablishmentRequest* message.

The UE re-establishment delay ($T_{UE\_re\text{-}establish\_delay}$) is specified in section 6.1.2.1.

6.1.2.1 UE Re-establishment delay requirement

The UE re-establishment delay ($T_{UE\_re-establish\_delay}$) is the time between the moments when any of the conditions requiring RRC re-establishment as defined in section 5.3.7 in TS 36.331 [2] is detected by the UE to the time when the UE sends PRACH to the target cell. The UE re-establishment delay ($T_{UE\_re-establish\_delay}$) requirement shall be less than:

$$T_{UE-re-establish\_delay} = 50 \text{ ms} + N_{freq}*Tsearch + T_{SI} + T_{PRACH}$$

T_{search}: It is the time required by the UE to search the target cell.

T_{search} = It is [100] ms if the target cell is known by the UE; the target cell is known if it has been measured by the UE in the last 5 seconds.

T_{search} = It is 800 ms if the target cell is unknown by the UE; the target cell is unknown if it has not been measured by the UE in the last 5 seconds.

T_{SI} = It is the time required for receiving all the relevant system information according to the reception procedure and the RRC procedure delay of system information blocks defined in TS 36.331 [2] for E-UTRAN cell.

T_{PRACH} = The additional delay caused by the random access procedure; it will be at least 10 ms due to random access occasion and there might be additional delay due to ramping procedure.

N_{freq}: It is the total number of E-UTRA frequencies to be monitored for RRC re-establishment; N_{freq} = 1 if the target cell is known.

There is no requirement if the target cell does not contain the UE context.

6.2 Random Access

6.2.1 Introduction

The random access procedure is used when establishing the layer 1 communication between the UE and E-UTRAN. The random access is specified in section 6 of TS 36.213[3] and the control of the RACH transmission is specified in section 5.1 of TS 36.321[17].

6.2.2 Requirements

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula defined in TS 36.213[3] and apply this power level at the first preamble or additional preambles. The absolute power applied to the first preamble shall have an accuracy as specified in table 6.3.5.1.1-1 of TS 36.101[5]. The relative power applied to additional preambles shall have an accuracy as specified in table 6.3.5.2.1-1 of 36.101[5].

The UE shall indicate a Random Access problem to upper layers if the maximum number of preamble transmission counter has been reached.

6.2.2.1 Contention based random access

6.2.2.1.1 Correct behaviour when receiving Random Access Response reception

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

6.2.2.1.2 Correct behaviour when not receiving Random Access Response reception

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window defined in clause 5.1.4 TS 36.321.

6.2.2.1.3 Correct behaviour when receiving a NACK on msg3

The UE shall re-transmit the msg3 upon the reception of a NACK on msg3.

6.2.2.1.4 Void

6.2.2.1.5 Correct behaviour when receiving a message over Temporary C-RNTI

The UE shall send ACK if the Contention Resolution is successful.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires unless the received message includes a UE Contention Resolution Identity MAC control element and the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message.

6.2.2.1.6 Correct behaviour when contention Resolution timer expires

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if the Contention Resolution Timer expires.

6.2.2.2 Non-Contention based random access

6.2.2.2.1 Correct behaviour when receiving Random Access Response

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

6.2.2.2.2 Correct behaviour when not receiving Random Access Response

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

7 Timing and signalling characteristics

7.1 UE transmit timing

7.1.1 Introduction

The UE shall have capability to follow the frame timing change of the connected eNode B. The uplink frame transmission takes place $(N_{\text{TA}} + N_{\text{TA offset}}) \times T_{\text{s}}$ before the reception of the first detected path (in time) of the corresponding downlink frame from the reference cell UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are defined in the following requirements.

7.1.2 Requirements

The UE initial transmission timing error shall be less than or equal to $\pm T_e$ where the timing error limit value T_e is specified in Table 7.1.2-1. This requirement applies when it is the first transmission in a DRX cycle for PUCCH, PUSCH and SRS or it is the PRACH transmission. The reference point for the UE initial transmit timing control requirement shall be the downlink timing minus $(N_{\text{TA\_Ref}} + N_{\text{TA offset}}) \times T_{\text{s}}$. The downlink timing is defined as the time when [the first detected path (in time)] of the corresponding downlink frame is received from the reference cell. $N_{\text{TA\_Ref}}$ for PRACH is defined as 0. $(N_{\text{TA\_Ref}} + N_{\text{TA offset}})$ (in T_s units) for other channels is the difference between UE transmission timing and the Downlink timing immediately after when the last timing advance in section 7.3 was applied. $N_{\mathrm{TA\_Ref}}$ for other channels is not changed until next timing advance is received.

Table 7.1.2-1: T_e Timing Error Limit

Downlink Bandwidth (MHz)	T_e
1.4	$24 \cdot T_S$
≥3	$12 \cdot T_S$
Note: T_S is the basic timing unit defined in TS 36.211	

When it is not the first transmission in a DRX cycle or there is no DRX cycle, and when it is the transmission for PUCCH, PUSCH and SRS transmission, the UE shall be capable of changing the transmission timing according to the received downlink frame except when the timing advance in section 7.3 is applied. When the transmission timing error between the UE and the reference timing exceeds $\pm T_e$ the UE is required to adjust its timing to within $\pm T_e$. The reference timing shall be $(N_{\mathrm{TA\_Ref}} + N_{\mathrm{TA\,offset}}) \times T_s$ before the downlink timing. All adjustments made to the UE uplink timing shall follow these rules:

1) The maximum amount of the magnitude of the timing change in one adjustment shall be T_q seconds.

2) The minimum aggregate adjustment rate shall be $7 \cdot T_S$ per second.

3) The maximum aggregate adjustment rate shall be T_q per 200ms.

where the maximum autonomous time adjustment step T_q is specified in Table 7.1.2-2.

Table 7.1.2-2: T_q Maximum Autonomous Time Adjustment Step

Downlink Bandwidth (MHz)	T_q
1.4	$16 \cdot T_S$
3	$8 \cdot T_S$
5	$4 \cdot T_S$
≥10	$2 \cdot T_S$
Note: T_S is the basic timing unit defined in TS 36.211	

7.2 UE timer accuracy

7.2.1 Introduction

UE timers are used in different protocol entities to control the UE behaviour.

7.2.2 Requirements

For UE timers specified in section 7.3 in [2], UE shall comply with the timer accuracies according to Table 7.2.2-1.

The requirements are only related to the actual timing measurements internally in the UE. They do not include the following:

- Inaccuracy in the start and stop conditions of a timer (e.g. UE reaction time to detect that start and stop conditions of a timer is fulfilled), or

- Inaccuracies due to restrictions in observability of start and stop conditions of a UE timer (e.g. TTI alignment when UE sends messages at timer expiry).

Table 7.2.2-1

Timer value [s]	Accuracy
timer value < 4	± 0.1s
timer value ≥ 4	± 2.5%

7.3 Timing Advance

7.3.1 Introduction

The timing advance is initiated from E-UTRAN with MAC message that implies and adjustment of the timing advance, see 3GPP TS 36.321 [17] section 5.2.

7.3.2 Requirements

7.3.2.1 Timing Advance adjustment delay

UE shall adjust the timing of its uplink transmission timing at sub-frame *n*+6 for a timing advancement command received in sub-frame *n*.

7.3.2.2 Timing Advance adjustment accuracy

The UE shall adjust the timing of its transmissions with a relative accuracy better than or equal to ±4* T_S seconds to the signalled timing advance value compared to the timing of preceding uplink transmission. The timing advance command is expressed in multiples of 16* T_S and is relative to the current uplink timing.

7.4 Cell phase synchronization accuracy (TDD)

7.4.1 Definition

Cell phase synchronization accuracy is defined as the maximum absolute deviation in frame start timing between any pair of cells on the same frequency that have overlapping coverage areas.

7.4.2 Minimum requirements

The cell phase synchronization accuracy measured at BS antenna connectors shall be better than the requirement specified in table 7.4.2-1. If a cell's coverage area overlaps with another cell with different cell radius then the cell phase synchronization accuracy corresponding to the larger of the two cell sizes applies to the overlapping cells with different radii.

Table 7.4.2-1 Cell phase synchronization requirement (TDD)

Cell Type	Cell Radius	Requirement
Small cell	≤ 3 km	≤ 3 µs
Large cell	> 3 km	≤ 10 µs

7.5 Synchronization Requirements for E-UTRAN to 1xRTT and HRPD Handovers

7.5.1 Introduction

This section contains the synchronization requirements for eNodeB capable of supporting E-UTRAN to CDMA 1xRTT and HRPD handovers. To facilitate E-UTRAN to CDMA 1xRTT and HRPD handovers, the CDMA System Time reference needs to be provided to the UE in order for the UE to report the pilot PN phases of the target 1xRTT or HRPD cells. This is achieved through the SIB8 message broadcasted by the serving eNodeB:

If the eNodeB is synchronized to the GPS time then the size of CDMA System Time information is 39 bits and the unit is 10 ms based on a 1.2288 Mcps chip rate.

If the eNodeB is not synchronized to the GPS time then the size of CDMA System Time information is 49 bits and the unit is 8 CDMA chips based on 1.2288 Mcps chip rate.

The CDMA system time reference provided by the serving eNodeB has to be within a certain level of accuracy in order to facilitate accurate reporting of the pilot PN phases of the target 1xRTT or HRPD cells and enable reliable handover to the 1xRTT or HRPD networks.

7.5.2 eNodeB Synchronization Requirements

7.5.2.1 Synchronized E-UTRAN

The eNodeB shall be synchronized to the GPS time. With external source of CDMA System Time disconnected, the eNodeB shall maintain the timing accuracy within ±10 μs of CDMA System Time for a period of not less than 8 hours.

The timing deviation between the SFN boundary at or immediately after the ending boundary of the SI-window in which *SystemInformationBlockType8* (containing the broadcasted CDMA System Time with 10-ms granularity) is transmitted and the broadcasted CDMA System Time shall be within 10 μs.

7.5.2.2 Non-Synchronized E-UTRAN

The timing deviation between the SFN boundary at or immediately after the end of the boundary of the SI-window in which *SystemInformationBlockType8* (containing the broadcasted CDMA System Time with 8-chip granularity) is transmitted and the broadcasted CDMA System Time shall be within 10 μs. With external source of CDMA System Time disconnected the SFN boundary at or immediately after the broadcasted CDMA System Time in the SIB8 message shall maintain the timing accuracy within ±10 μs of CDMA System Time for a period of not less than 8 hours.

7.6 Radio Link Monitoring

7.6 .1 Introduction

The UE shall monitor the downlink link quality based on the cell-specific reference signal in order to detect the downlink radio link quality of the serving cell as specified in [3].

The UE shall estimate the downlink radio link quality and compare it to the thresholds Q_{out} and Q_{in} for the purpose of monitoring downlink radio link quality of the serving cell.

The threshold Q_{out} is defined as the level at which the downlink radio link cannot be reliably received and shall correspond to 10% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.6.1-1.

The threshold Q_{in} is defined as the level at which the downlink radio link quality can be significantly more reliably received than at Q_{out} and shall correspond to 2% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.6.1-2.

Table 7.6.1-1 PDCCH/PCFICH transmission parameters for out-of-sync

Attribute	Value
DCI format	1A
Number of control OFDM symbols	2; Bandwidth ≥ 10 MHz 3; [3] MHz ≤ Bandwidth ≤ 5 MHz 4; Bandwidth = 1.4 MHz
Aggregation level (CCE)	4; Bandwidth = 1.4 MHz 8; Bandwidth ≥ 3 MHz
Ratio of PDCCH RE energy to average RS RE energy	4 dB; when single antenna port is used for cell-specific reference signal transmission by the serving cell

	1 dB: when two or four antenna ports are used for cell-specific reference signal transmission by the serving cell
Ratio of PCFICH RE energy to average RS RE energy	4 dB; when single antenna port is used for cell-specific reference signal transmission by the serving cell 1 dB: when two or four antenna ports are used for cell-specific reference signal transmission by the serving cell

Note 1: DCI format 1A is defined in section 5.3.3.1.3 in 3GPP TS 36.212 [21].

Note 2: A hypothetical PCFICH transmission corresponding to the number of control symbols shall be assumed.

Table 7.6.1-2 PDCCH/PCFICH transmission parameters for in-sync

Attribute	Value
DCI format	1C
Number of control OFDM symbols	2; Bandwidth ≥ 10 MHz 3; 3 MHz ≤ Bandwidth ≤ 5 MHz 4; Bandwidth = 1.4 MHz
Aggregation level (CCE)	4
Ratio of PDCCH RE energy to average RS RE energy	0 dB; when single antenna port is used for cell-specific reference signal transmission by the serving cell -3 dB; when two or four antenna ports are used for cell-specific reference signal transmission by the serving cell
Ratio of PCFICH RE energy to average RS RE energy	4 dB; when single antenna port is used for cell-specific reference signal transmission by the serving cell 1 dB: when two or four antenna ports are used for cell-specific reference signal transmission by the serving cell
Note 1: DCI format 1C is defined in section 5.3.3.1.4 in 3GPP TS 36.212 [21]. Note 2: A hypothetical PCFICH transmission corresponding to the number of control symbols shall be assumed.	

7.6.2 Requirements

7.6.2.1 Minimum requirement when no DRX is used

When the downlink radio link quality estimated over the last 200 ms period becomes worse than the threshold Qout, Layer 1 of the UE shall send an out-of-sync indication to the higher layers within 200 ms Qout evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in [2].

When the downlink radio link quality estimated over the last 100 ms period becomes better than the threshold Qin, Layer 1 of the UE shall send an in-sync indication to the higher layers within 100 ms Qin evaluation period. A L3 filter shall be applied to the in-sync indications as specified in [2].

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least 10 ms.

The transmitter power shall be turned off within [40] ms after expiry of T310 timer as specified in section 5.3.11 in [2].

7.6.2.2 Minimum requirement when DRX is used

When DRX is used the Qout evaluation period ($T_{Evaluate\_}Q_{out\_DRX}$) and the Qin evaluation period ($T_{Evaluate\_}Q_{in\_DRX}$) is specified in Table 7.6.2.2-1 will be used.

When the downlink radio link quality estimated over the last $T_{Evaluate\_}Q_{out\_DRX}$ [s] period becomes worse than the threshold Qout, Layer 1 of the UE shall send out-of-sync indication to the higher layers within $T_{Evaluate\_}Q_{out\_DRX}$ [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in [2].

When the downlink radio link quality estimated over the last $T_{Evaluate\_}Q_{in\_DRX}$ [s] period becomes better than the threshold Qin, Layer 1 of the UE shall send in-sync indications to the higher layers within $T_{Evaluate\_}Q_{in\_DRX}$ [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in [2].

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10 ms, DRX_cycle_length).

Upon start of T310 timer as specified in section 5.3.11 in [2], the UE shall monitor the link for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry or stop of T310 timer.

The transmitter power shall be turned off within 40 ms after expiry of T310 timer as specified in section 5.3.11 in [2].

7.6.2.3 Minimum requirement at transitions

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10 ms, DRX_cycle_length).

When the UE transitions between DRX and non-DRX or when DRX cycle periodicity changes, for a duration of time equal to the evaluation period corresponding to the second mode after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation periods corresponding to the first mode and the second mode. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second mode. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation.

Table 7.6.2.2-1: Q_{out} and Q_{in} Evaluation Period in DRX

DRX cycle length (s)	$T_{Evaluate\_}Q_{out\_DRX}$ and $T_{Evaluate\_}Q_{in\_DRX}$ (s) (DRX cycles)
≤ 0.01	Non-DRX requirements in section 7.6.2.1 are applicable.
0.01 < DRX cycle ≤0.04	Note (20)
0.04 < DRX cycle ≤ 0.64	Note (10)
0.64 < DRX cycle ≤ 2.56	Note (5)
Note: Evaluation period length in time depends on the length of the DRX cycle in use	

8 UE Measurements Procedures in RRC_CONNECTED State

8.1 General Measurement Requirements

8.1.1 Introduction

This section contains requirements on the UE regarding measurement reporting in RRC_CONNECTED state. The requirements are split in E-UTRA intra frequency, E-UTRA inter frequency, Inter-RAT UTRA FDD, UTRA TDD and GSM measurements. These measurements may be used by the E-UTRAN, e.g. for handover decisions. The measurement quantities are defined in [4], the measurement model is defined in [22] and measurement accuracies are specified in section 9. Control of measurement reporting is specified in [2].

8.1.2 Requirements

8.1.2.1 UE measurement capability

If the UE requires measurement gaps to identify and measure inter-frequency and/or inter-RAT cells, in order for the requirements in the following subsections to apply the E-UTRAN must provide a single measurement gap pattern with constant gap duration for concurrent monitoring of all frequency layers and RATs.

During the measurement gaps the UE:

- shall not transmit any data
- is not expected to tune its receiver on the E-UTRAN serving carrier frequency.

Inter-frequency and inter-RAT measurement requirements within this section rely on the UE being configured with one measurement gap pattern. UEs shall only support those measurement gap patterns listed in Table 8.1.2.1-1 that are relevant to its measurement capabilities.

Table 8.1.2.1-1: Gap Pattern Configurations supported by the UE

Gap Pattern Id	MeasurementGap Length (MGL, ms)	Measurement Gap Repetition Period (MGRP, ms)	Minimum available time for inter-frequency and inter-RAT measurements during 480ms period (Tinter1, ms)	Measurement Purpose
0	6	40	60	Inter-Frequency E-UTRAN FDD and TDD, UTRAN FDD, GERAN, LCR TDD, HRPD, CDMA2000 1x
1	6	80	30	Inter-Frequency E-UTRAN FDD and TDD, UTRAN FDD, GERAN, LCR TDD, HRPD, CDMA2000 1x

[Editor's note: Further patterns still need to be defined in order to fulfil all required Inter-RAT monitoring purposes.]

NOTE 1: For E-UTRAN FDD, the UE shall not transmit in the subframe occurring immediately after the measurement gap.

NOTE 2: For E-UTRAN TDD, the UE shall not transmit in the uplink subframe occurring immediately after the measurement gap if the subframe occurring immediately before the measurement gap is a downlink subframe.

The requirements in section 9 are applicable for a UE performing measurements according to this section.

8.1.2.1.1 Monitoring of multiple layers using gaps

When monitoring of multiple inter-frequency E-UTRAN and inter-RAT (UTRAN, GSM) using gaps is configured, the UE shall be capable of performing one measurement of the configured measurement type (RSRP, RSRQ, UTRAN TDD P-CCPCH RSCP, UTRAN FDD CPICH measurements, GSM carrier RSSI, etc.) of detected cells on all the layers

The effective total number of frequencies excluding the serving frequency being monitored using gaps is N_{freq}, which is defined as:

$N_{freq} = N_{freq,\ E\text{-}UTRA} + N_{freq,\ UTRA} + M_{gsm} + N_{freq,\ cdma2000} + N_{freq,\ HRPD}$

where

$N_{freq,\ E\text{-}UTRA}$ is the number of E-UTRA carriers being monitored (FDD and TDD)

$N_{freq,\ UTRA}$ is the number of UTRA carriers being monitored (FDD and TDD)

M_{GSM} is an integer which is a function of the number of GSM carriers on which measurements are being performed. M_{GSM} is equal to 0 if no GSM carrier is being monitored. For a MGRP of 40 ms, M_{GSM} is equal to 1 if cells on up to 32 GSM carriers are being measured. For a MGRP of 80 ms, M_{GSM} is equal to ceil($N_{carriers,GSM}$ /20) where $N_{carriers,GSM}$ is the number of GSM carriers on which cells are being measured.

$N_{freq,\ cdma2000}$ is the number of cdma2000 1x carriers being monitored

$N_{freq,\ HRPD}$ is the number of HRPD carriers being monitored

8.1.2.1.1.1 Maximum allowed layers for multiple monitoring

The UE shall be capable of monitoring using gaps at least:

- Depending on UE capability, 3 FDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 3 TDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 3 FDD UTRA carriers, and
- Depending on UE capability, 3 TDD UTRA carriers, and
- Depending on UE capability, 32 GSM carriers (one GSM layer corresponds to 32 cells) , and
- Depending on UE capability, 5 cdma2000 1x carriers, and
- Depending on UE capability, 5 HRPD carriers

In addition to the requirements defined above, the UE shall be capable of monitoring using gaps a total of at least 7 carrier frequency layers comprising of any above defined combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD and GSM layers (one GSM layer corresponds to 32 carriers), cdma2000 1x and HRPD layers.

8.1.2.2 E-UTRAN intra frequency measurements

The UE shall be able to identify new intra-frequency cells and perform RSRP measurements of identified intra-frequency cells without an explicit intra-frequency neighbour cell list containing physical layer cell identities. During the RRC_CONNECTED state the UE shall continuously measure identified intra frequency cells and additionally search for and identify new intra frequency cells.

8.1.2.2.1 E-UTRAN FDD intra frequency measurements

8.1.2.2.1.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within

$$T_{\text{identify intra}} = T_{\text{basic identify }E-UTRA\_\text{FDD, intra}} \cdot \frac{T_{\text{Measurement Period, Intra}}}{T_{\text{Intra}}} \quad ms$$

where

$T_{\text{basic\_identify\_E-UTRA\_FDD, intra}}$ is 800 ms

A cell shall be considered detectable when

- RSRP related side condition given in Section 9.1 are fulfilled for a corresponding Band,
- SCH_RP$|_{dBm}$ ≥ -127 dBm for Bands 1, 4, 6, 10, 11 and SCH Ês/Iot ≥ - 6 dB.
- SCH_RP$|_{dBm}$≥ -126 dBm for Band 9 and SCH Ês/Iot ≥ - 6 dB,
- SCH_RP $|_{dBm}$≥ -125 dBm for Bands 2, 5, 7 and SCH Ês/Iot ≥ - 6 dB,
- SCH_RP $|_{dBm}$≥ -124 dBm for Bands 3, 8, 12, 13, 14, 17 and SCH Ês/Iot ≥ - 6 dB.

T_{Intra} : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. Time is assumed to be available for performing intra frequency measurements whenever the receiver is guaranteed to be active on the intra frequency carrier.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\ Intra}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRPand RSRQ measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least $Y_{measurement\ intra}$ cells , where $Y_{measurement\ intra}$ is defined in the following equation. If the UE has identified more than $Y_{measurement\ intra}$ cells, the UE shall perform measurements at least 8 identified intra-frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{\text{measurement intra}} = Floor\left\{ X_{\text{basic measurement FDD}} \cdot \frac{T_{\text{Intra}}}{T_{\text{Measurement\_Period, Intra}}} \right\} \text{cells}$$

where

$X_{basic\ measurement\ FDD}$ = 8 (cells)

$T_{Measurement\_Period\ Intra}$ = 200 ms. The measurement period for Intra frequency RSRP and RSRQ measurements.

T_{Intra} : This is the time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. Time is assumed to be available for performing intra frequency measurements whenever the receiver is guaranteed to be active on the intra frequency carrier.

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.

8.1.2.2.1.1.1 Measurement Reporting Requirements

8.1.2.2.1.1.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.2.1.1.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2.2.1.1.1.3 Event Triggered Reporting.

8.1.2.2.1.1.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resoureces for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\ intra}$ defined in Section 8.1.2.2.1.1. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in section 8.1.2.2.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.1.2.2.1.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{identify\_intra}$ as shown in table 8.1.2.2.1.2-1

Table 8.1.2.2.1.2-1: Requirement to identify a newly detectable FDD intrafrequency cell

DRX cycle length (s)	$T_{identify\_intra}$ (s) (DRX cycles)
≤0.04	0.8 (Note1)
0.04<DRX-cycle≤0.08	Note2 (40)
0.128	3.2 (25)
0.128<DRX-cycle≤2.56	Note2(20)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

A cell shall be considered detectable when

- RSRP related side condition given in Section 9.1 are fulfilled for a corresponding Band,
- SCH_RP $\geq|_{dBm}$ -127 dBm for Bands 1, 4, 6, 10, 11 and SCH Ês/Iot ≥ - 6 dB.
- SCH_RP$|_{dBm}\geq$ -126 dBm for Band 9 and SCH Ês/Iot ≥ - 6 dB,
- SCH_RP $|_{dBm}\geq$ -125 dBm for Bands 2, 5, 7and SCH Ês/Iot ≥ - 6 dB,
- SCH_RP $|_{dBm}\geq$ -124 dBm for Bands 3, 8, 12, 13, 14, 17 and SCH Ês/Iot ≥ - 6 dB.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra}$ as shown in table 8.1.2.2.1.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra}$.

Table 8.1.2.2.1.2-2: Requirement to measure FDD intrafrequency cells

DRX cycle length (s)	$T_{measure\_intra}$ (s) (DRX cycles)
≤0.04	0.2 (Note1)
0.04<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.

8.1.2.2.1.2.1 Measurement Reporting Requirements

8.1.2.2.1.2.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.2.1.2.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2.2.1.2.1.3 Event Triggered Reporting.

8.1.2.2.1.2.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra}$ defined in Section 8.1.2.2.1.2. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in section 8.1.2.2.1.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.1.2.2.2 E-UTRAN TDD intra frequency measurements

8.1.2.2.2.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within

$$T_{\text{identify intra}} = T_{\text{basic identify } E-UTRA\_\text{TDD, intra}} \cdot \frac{T_{\text{Measurement Period, Intra}}}{T_{\text{Intra}}} \quad ms$$

where

$T_{basic\_identify\_E\text{-}UTRA\_TDD,\ intra}$ is 800 ms

A cell shall be considered detectable when

- RSRP related side condition given in Section 9.1 are fulfilled for a corresponding Band,
- SCH_RP ≥ -127 dBm for Bands 33, 34, 35, 36, 37, 38, 39, 40 and SCH Ês/Iot ≥ - 6 dB.

T_{Intra} : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. Time is assumed to be available for performing intra frequency measurements whenever the receiver is guaranteed to be active on the intra frequency carrier.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\ Intra}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP and RSRQ measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least $Y_{measurement\ intra}$ cells , where $Y_{measurement\ intra}$ is defined in the following equation. If the UE has identified more than $Y_{measurement\ intra}$ cells, the UE shall perform measurements at least 8 identified intra-frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$\mathrm{Y}_{\text{measurement intra}} = Floor\left\{ X_{\text{basic measurement TDD}} \cdot \frac{\mathrm{T}_{\text{Intra}}}{\mathrm{T}_{\text{Measurement\_Period, Intra}}} \right\} \text{cells}$$

where

$X_{\text{basic measurement TDD}}$ = 8 (cells)

$T_{\text{Measurement\_Period Intra}}$ = 200 ms. The measurement period for Intra frequency RSRP and RSRQ measurements.

T_{Intra} : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. Time is assumed to be available for performing intra frequency measurements whenever the receiver is guaranteed to be active on the intra frequency carrier.

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.

8.1.2.2.2.1.1 Measurement Reporting Requirements

8.1.2.2.2.1.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.2.2.1.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2.2.2.1.1.3 Event Triggered Reporting.

8.1.2.2.2.1.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify intra}}$ defined in Section 8.1.2.2.2.1. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{\text{identify\_intra}}$ defined in section 8.1.2.2.2.1 becomes undetectable for a period $\leq$ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{\text{Measurement\_Period Intra}}$ provided the timing to that cell has not changed more than $\pm$ 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.1.2.2.2.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within $T_{\text{identify\_intra}}$ as shown in table 8.1.2.2.2.2-1

Table 8.1.2.2.2.2-1: Requirement to identify a newly detectable TDD intrafrequency cell

DRX cycle length (s)	$T_{identify\_intra}$ (s) (DRX cycles)
≤0.04	0.8 (Note1)
0.04<DRX-cycle≤0.08	Note2 (40)
0.128	3.2 (25)
0.128<DRX-cycle≤2.56	Note2(20)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

A cell shall be considered detectable when

- RSRP related side condition given in Section 9.1 are fulfilled for a corresponding Band,
- SCH_RP ≥ -127 dBm for Bands 33, 34, 35, 36, 37, 38, 39, 40 and SCH Ês/Iot ≥ - 6 dB.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra}$ as shown in table 8.1.2.2.2.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified-intra-frequency cells and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra}$.

Table 8.1.2.2.2.2-2: Requirement to measure TDD intra frequency cells

DRX cycle length (s)	$T_{measure\_intra}$ (s) (DRX cycles)
≤0.04	0.2 (Note1)
0.04<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use. Note2: Time depends upon the DRX cycle in use.	

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.

8.1.2.2.2.2.1 Measurement Reporting Requirements

8.1.2.2.2.2.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.2.2.2.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2.2.2.2.1.3 Event Triggered Reporting.

8.1.2.2.2.2.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: [2] x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra}$ defined in Section 8.1.2.2.2.2. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in section 8.1.2.2.2.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.1.2.3 E-UTRAN inter frequency measurements

The UE shall be able to identify new inter-frequency cells and perform RSRP measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided.

8.1.2.3.1 E-UTRAN FDD – FDD inter frequency measurements

8.1.2.3.1.1 E-UTRAN FDD – FDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled the UE shall be able to identify a new FDD inter-frequency within $T_{Identify\_Inter}$ according to the following expression:

$$\mathrm{T}_{\mathrm{Identify\_Inter}} = \mathrm{T}_{\mathrm{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathrm{T}_{\mathrm{Inter1}}} \cdot N_{freq} \quad ms$$

Where:

$T_{Basic\_Identify\_Inter}$ = 480 ms. It is the time period used in the inter frequency equation where the maximum allowed time for the UE to identify a new FDD inter-frequency cell is defined.

N_{freq} is defined in section 8.1.2.1.1 and T_{inter1} is defined in section 8.1.2.1

A cell shall be considered detectable provided following conditions are fulfilled:

- $RSRP|_{dBm} \geq -125$ dBm and for Bands 1, 4, 6, 10, 11 and RSRP Ês/Iot ≥ -4 dB,
- $RSRP|_{dBm} \geq -124$ dBm for Bands 9 and RSRP Ês/Iot ≥ -4 dB,
- $RSRP|_{dBm} \geq -123$ dBm for Bands 2, 5, 7 and RSRP Ês/Iot ≥ -4 dB,
- $RSRP|_{dBm} \geq -122$ dBm for Bands 3, 8, 12, 13, 14, 17 and RSRP Ês/Iot ≥ -4 dB,
- other RSRP related side conditions given in Section 9.1 are fulfilled,
- $SCH\_RP|_{dBm} \geq -125$ dBm for Bands 1, 4, 6, 10, 11 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP|_{dBm} \geq -124$ dBm for Band 9 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP\ |_{dBm} \geq -123$ dBm for Bands 2, 5, 7 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP\ |_{dBm} \geq -122$ dBm for Bands 3, 8, 12, 13, 14, 17 and SCH Ês/Iot ≥ -4 dB.

When measurement gaps are scheduled for FDD inter frequency measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in sub-clause 9.1.3 with measurement period given by table 8.1.2.3.1.1-1.

Table 8.1.2.3.1.1-1: RSRP measurement period and measurement bandwidth

Configuration	Physical Layer Measurement period: $T_{Measurement\_Period\_Inter\_FDD}$ [ms]	Measurement bandwidth [RB]
0	480 x N_{freq}	6
1 (Note)	240 x N_{freq}	50
Note: This configuration is optional		

The UE shall be capable of performing RSRP and RSRQ measurements of at least 4 inter-frequency cells per FDD inter-frequency for up to 3 FDD inter-frequencies and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in Table 8.1.2.3.1-1.

8.1.2.3.1.1.1 Measurement Reporting Requirements

8.1.2.3.1.1.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.3.1.1.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2. 3.1.1.1.3 Event Triggered Reporting.

8.1.2.3.1.1.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH . The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\text{-}inter}$ defined in Section 8.1.2.3.1.1. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_inter}$ defined in section 8.1.2.3.1.1 and then enters or leaves the reporting range, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\_Inter\_FDD}$ defined in section 8.1.2.3.1.1 provided the timing to that cell has not changed more than ± 50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.1.2.3.1.2 E-UTRAN FDD – FDD inter frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable E-UTRAN FDD inter frequency cell within $T_{identify\_inter}$ as shown in table 8.1.2.3.1.2-1

Table 8.1.2.3.1.2-1: Requirement to identify a newly detectable FDD interfrequency cell

DRX cycle length (s)	$T_{identify\_inter}$ (s) (DRX cycles)	
	Gap period = 40 ms	Gap period = 80 ms
≤0.16	Non DRX Requirements in section 8.1.2.3.1.1 are applicable	Non DRX Requirements in section 8.1.2.3.1.1 are applicable
0.256	5.12*N_{freq} (20*N_{freq})	7.68*N_{freq} (30*N_{freq})
0.32	6.4*N_{freq} (20*N_{freq})	7.68*N_{freq} (24*N_{freq})
0.32< DRX-cycle≤2.56	Note (20*N_{freq})	Note (20*N_{freq})
Note: Time depends upon the DRX cycle in use dxc fdfs sfd		

A cell shall be considered detectable provided following conditions are fulfilled:

- RSRP$|_{dBm}$≥ -125 dBm and for Bands 1, 4, 6, 10, 11 and RSRP Ês/Iot ≥ -4 dB,
- RSRP$|_{dBm}$≥ -124 dBm for Bands 9 and RSRP Ês/Iot ≥ -4 dB,
- RSRP$|_{dBm}$≥ -123 dBm for Bands 2, 5, 7 and RSRP Ês/Iot ≥ -4 dB,
- RSRP$|_{dBm}$≥ -122 dBm for Bands 3, 8, 12, 13, 14, 17 and RSRP Ês/Iot ≥ -4 dB,
- other RSRP related side conditions given in Section 9.1 are fulfilled,
- SCH_RP$|_{dBm}$≥ -125 dBm for Bands 1, 4, 6, 10, 11 and SCH Ês/Iot ≥ -4 dB,
- SCH_RP$|_{dBm}$≥ -124 dBm for Band 9 and SCH Ês/Iot ≥ -4 dB,
- SCH_RP $|_{dBm}$≥ -123 dBm for Bands 2, 5, 7 and SCH Ês/Iot ≥ -4 dB,
- SCH_RP $|_{dBm}$≥ -122 dBm for Bands 3, 8, 12, 13, 14, 17 and SCH Ês/Iot ≥ -4 dB.

The UE shall be capable of performing RSRP and RSRQ measurements of at least 4 inter-frequency cells per FDD inter-frequency and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in table 8.1.2.3.1.2-2.

Table 8.1.2.3.1.2-2: Requirement to measure FDD interfrequency cells

DRX cycle length (s)	$T_{measure\_inter}$ (s) (DRX cycles)
≤0.08	Non DRX Requirements in section 8.1.2.3.1.1 are applicable
0.08 < DRX-cycle ≤ 2.56	Note (5*N_{freq})
Note: Time depends upon the DRX cycle in use	

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.

8.1.2.3.1.2.1 Measurement Reporting Requirements

8.1.2.3.1.2.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.3.1.2.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2. 3.1.2.1.3 Event Triggered Reporting.

8.1.2.3.1.2.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_inter}$ defined in Section 8.1.2.3.1.2. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_inter}$ defined in section 8.1.2.3.1.2 and then enters or leaves the reporting range, the event triggered measurement reporting delay shall be less than $T_{measure\_inter}$ defined in section 8.1.2.3.1.2 provided the timing to that cell has not changed more than ± 50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.1.2.3.2 E-UTRAN TDD – TDD inter frequency measurements

8.1.2.3.2.1 E-UTRAN TDD – TDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled the UE shall be able to identify a new TDD inter-frequency within $T_{Identify\_Inter}$ according to the following expression:

$$T_{Identify\_Inter} = T_{Basic\_Identify\_Inter} \cdot \frac{480}{T_{Inter1}} \cdot N_{freq} \quad ms$$

Where:

> $T_{Basic\_Identify\_Inter}$ = 480 ms. It is the time period used in the inter frequency equation where the maximum allowed time for the UE to identify a new TDD inter-frequency cell is defined.
>
> N_{freq} is defined in section 8.1.2.1.1 and T_{inter1} is defined in section 8.1.2.1

A cell shall be considered detectable provided following conditions are fulfilled:

- $RSRP|_{dBm}$ ≥ -125 dBm and for Bands 33, 34, 35, 36, 37, 38, 39, 40 and RSRP Ês/Iot ≥ -4 dB,
- other RSRP related side conditions given in Section 9.1 are fulfilled,
- $SCH\_RP|_{dBm}$≥ -125 dBm for Bands 33, 34, 35, 36, 37, 38, 39, 40 and SCH Ês/Iot ≥ -4 dB.

When measurement gaps are scheduled for TDD inter frequency measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in sub-clause 9.1.3 with measurement period ($T_{Measurement\_Period\_TDD\_Inter}$) given by table 8.1.2.3.2.1-1:

Table 8.1.2.3.2.1-1: $T_{Measurement\_Period\_TDD\_Inter}$ for different configurations

Configuration	Measurement bandwidth [RB]	Number of UL/DL sub-frames per half frame (5 ms)		DwPTS		$T_{Measurement\_Period\_TDD\_Inter}$ [ms]
		DL	UL	Normal CP	Extended CP	
0	6	2	2	$19760 \cdot T_s$	$20480 \cdot T_s$	480 x N_{freq}
1 (Note 1)	50	2	2	$19760 \cdot T_s$	$20480 \cdot T_s$	240 x N_{freq}
Note 1: This configuration is optional Note 2: T_s is defined in 3GPP TS 36.211 [16]						

The UE shall be capable of performing RSRP and RSRQ measurements of at least 4 inter-frequency cells per TDD inter-frequency and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period $T_{Measurement\_Period\_TDD\_Inter}$.

8.1.2.3.2.1.1 Measurement Reporting Requirements

8.1.2.3.2.1.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.3.2.1.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2.3.2.1.1.3 Event Triggered Reporting.

8.1.2.3.2.1.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{Identify\_Inter}$ defined in Section 8.1.2.3.2.1. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{Identify\_Inter}$ defined in section 8.1.2.3.2.1 and then enters or leaves the reporting range, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\_TDD\_Inter}$ defined in section 8.1.2.3.2.1 provided the timing to that cell has not changed more than ± 50 Ts while measurementgap has not been available and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.1.2.3.2.2 E-UTRAN TDD – TDD inter frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable E-UTRAN TDD inter frequency cell within $T_{identify\_inter}$ as shown in table 8.1.2.3.2.2-1

Table 8.1.2.3.2.2-1: Requirement to identify a newly detectable TDD interfrequency cell

DRX cycle length (s)	$T_{identify\_inter}$ (s) (DRX cycles)	
	Gap period = 40 ms	Gap period = 80 ms
≤0.16	Non DRX Requirements in section 8.1.2.3.2.1 are applicable	Non DRX Requirements in section 8.1.2.3.2.1 are applicable
0.256	5.12*Nfreq (20*Nfreq)	7.68*Nfreq (30*Nfreq)
0.32	6.4*Nfreq (20*Nfreq)	7.68*Nfreq (24*Nfreq)
0.32<DRX-cycle≤2.56	Note (20*Nfreq)	Note (20*Nfreq)
Note: Time depends upon the DRX cycle in use		

A cell shall be considered detectable provided following conditions are fulfilled:

- $RSRP|_{dBm}$≥ -125 dBm and for Bands 33, 34, 35, 36, 37, 38, 39, 40 and RSRP Ês/Iot ≥ -4 dB,
- RSRP related side conditions given in Section 9.1 are fulfilled,
- $SCH\_RP|_{dBm}$≥ -125 dBm for Bands 33, 34, 35, 36, 37, 38, 39, 40 and SCH Ês/Iot ≥ -4 dB.

The UE shall be capable of performing RSRP and RSRQ measurements of at least 4 inter-frequency cells per TDD inter-frequency for up to 3 TDD inter-frequencies and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in Table 8.1.2.3.2.2-2.

Table 8.1.2.3.2.2-2: Requirement to measure TDD interfrequency cells

DRX cycle length (s)	$T_{measure\_inter}$ (s) (DRX cycles)
≤0.08	Non DRX Requirements in section 8.1.2.3.2.1 are applicable
0.08 <DRX-cycle ≤ 2.56	Note ($5*N_{freq}$)
Note: Time depends upon the DRX cycle in use	

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.

8.1.2.3.2.2.1 Measurement Reporting Requirements

8.1.2.3.2.2.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.3.2.2.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2.3.2.2.1.3 Event Triggered Reporting.

8.1.2.3.2.2.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{Identify\_Inter}$ defined in Section 8.1.2.3.2.2. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{Identify\_Inter}$ in section 8.1.2.3.2.2 and then enters or leaves the reporting range, the event triggered measurement reporting delay shall be less than $T_{measure\_inter}$ in section 8.1.2.3.2.2 provided the timing to that cell has not changed more than ± 50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.1.2.3.3 E-UTRAN TDD – FDD inter frequency measurements

8.1.2.3.3.1 E-UTRAN TDD – FDD inter frequency measurements when no DRX is used

The requirements in this section shall apply to UE supporting FDD and TDD.

The requirements in section 8.1.2.3.1.1 also apply for this section.

8.1.2.3.3.2 E-UTRAN TDD – FDD inter frequency measurements when DRX is used

The requirements in this section shall apply to UE supporting FDD and TDD.

The requirements in section 8.1.2.3.1.2 also apply for this section.

8.1.2.3.4 E-UTRAN FDD – TDD inter frequency measurements

8.1.2.3.4.1 E-UTRAN FDD – TDD inter frequency measurements when no DRX is used

The requirements in this section shall apply to UE supporting FDD and TDD.

The requirements in section 8.1.2.3.2.1 also apply for this section.

8.1.2.3.4.2 E-UTRAN FDD – TDD inter frequency measurements when DRX is used

The requirements in this section shall apply to UE supporting FDD and TDD.

The requirements in section 8.1.2.3.2.2 also apply for this section.

8.1.2.4 Inter RAT measurements

8.1.2.4.1 E-UTRAN FDD – UTRAN FDD measurements

8.1.2.4.1.1 E-UTRAN FDD – UTRAN FDD measurements when no DRX is used

8.1.2.4.1.1.1 Identification of a new UTRA FDD cell

When explicit neighbour list is provided and no DRX is used the UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify, UTRA\_FDD}} = T_{\text{basic\_identify\_UTRA\_FDD}} \cdot \frac{480}{T_{\text{inter1}}} \cdot N_{Freq} \quad ms$$

A cell shall be considered detectable when

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io $\geq$ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

8.1.2.4.1.1.2 UE UTRA FDD CPICH measurement capability

When measurement gaps are scheduled for UTRA FDD inter RAT measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in Section 9.2 with measurement period given by

$$T_{\text{measurement\_UTRA\_FDD}} = Max\left\{ T_{\text{Measurement\_Period UTRA\_FDD}}, T_{\text{basic\_measurement\_UTRA\_FDD}} \cdot \frac{480}{T_{\text{inter1}}} \cdot N_{Freq} \right\} ms$$

If the UE does not need measurement gaps to perform UTRA FDD measurements, the measurement period for UTRA FDD measurements is 480 ms.

The UE shall be capable of performing UTRA FDD CPICH measurements for $X_{\text{basic measurementUTRA\_FDD}}$ inter-frequency cells per FDD frequency and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{\text{Measurement\_ UTRA\_FDD}}$.

$X_{\text{basic measurement UTRA\_FDD}} = 6$

$T_{\text{Measurement\_Period UTRA\_FDD}}$ = 480 ms. The period used for calculating the measurement period $T_{\text{measurement\_UTRA\_FDD}}$ for UTRA FDD CPICH measurements.

$T_{\text{basic\_identify\_UTRA\_FDD}}$ = 300 ms. This is the time period used in the inter RAT equation where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

$T_{\text{basic\_measurement\_UTRA\_FDD}}$ = 50 ms. This is the time period used in the equation for defining the measurement period for inter RAT CPICH measurements.

N_{freq} is defined in section 8.1.2.1.1 and T_{inter1} is defined in section 8.1.2.1

8.1.2.4.1.1.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.4.1.1.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify, UTRA\_FDD}}$ defined in Section 8.1.2.4.1.1.1. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{\text{identify, UTRA\_FDD}}$ defined in section 8.1.2.4.1.1.1 and then enters or leaves the reporting range, the event triggered measurement reporting delay shall be less than $T_{\text{measurement\_UTRA\_FDD}}$ defined in section 8.1.2.4.1.1.2 provided the timing to that cell has not changed more than ± 32 chips while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.1.2.4.1.1.5 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2.4.1.1.4 Event Triggered Reporting.

8.1.2.4.1.2 E-UTRAN FDD – UTRAN FDD measurements when DRX is used

When explicit neighbour list is provided and DRX is used the UE shall be able to identify a new detectable cell belonging to the neighbour cell list within $T_{identify,UTRA\_FDD}$ as shown in table 8.1.2.4.1.2-1

Table 8.1.2.4.1.2-1: Requirement to identify a newly detectable UTRA FDD cell

DRX cycle length (s)	$T_{identify\_UTRA\_FDD}$ (s) (DRX cycles)	
	Gap period = 40 ms	Gap period = 80 ms
≤0.04	Non DRX Requirements in section 8.1.2.4.1.1 are applicable	Non DRX Requirements in section 8.1.2.4.1.1 are applicable
0.064	2.56* Nfreq (40* Nfreq)	4.8* Nfreq (75* Nfreq)
0.08	3.2* Nfreq (40* Nfreq)	4.8* Nfreq (60* Nfreq)
0.128	3.2* Nfreq (25* Nfreq)	4.8* Nfreq (37.5* Nfreq)
0.16	3.2* Nfreq (20* Nfreq)	4.8* Nfreq (30* Nfreq)
0.16<DRX-cycle≤2.56	Note (20* Nfreq)	Note (20* Nfreq)
Note: Time depends upon the DRX cycle in use		

A cell shall be considered detectable provided following conditions are fulfilled: A cell shall be considered detectable when

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io $\geq$ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

The UE shall be capable of performing RSCP and Ec/Io measurements of at least 6 UTRA cells per UTRA FDD carrier for up to 3 UTRA FDD carriers and the UE physical layer shall be capable of reporting RSCP and Ec/Io measurements to higher layers with the measurement period defined in table 8.1.2.3.1.2-2.

Table 8.1.2.4.1.2-2: Requirement to measure UTRA FDD cells

DRX cycle length (s)	$T_{measure\_UTRA\_FDD}$ (s) (DRX cycles)	
	Gap period = 40 ms	Gap period = 80 ms
≤0.04	Non DRX Requirements in section 8.1.2.4.1.1 are applicable	Non DRX Requirements in section 8.1.2.4.1.1 are applicable
0.064	0.48* N_{freq} (7.5* N_{freq})	0.8* N_{freq} (12.5* N_{freq})
0.08	0.48* N_{freq} (6* N_{freq})	0. 8* N_{freq} (10* N_{freq})
0.128	0.64* N_{freq} (5* N_{freq})	0. 8* N_{freq} (6.25* N_{freq})
0.128<DRX-cycle≤2.56	Note (5* N_{freq})	Note (5* N_{freq})
Note: Time depends upon the DRX cycle in use		

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.

8.1.2.4.1.2.1 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.4.1.2.2 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify,UTRA\_FDD}$ defined in Section 8.1.2.4.1.2. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify,\ UTRA\_FDD}$ defined in section 8.1.2.4.1.2 and then enters or leaves the reporting range, the event triggered measurement reporting delay shall be less than $T_{measurement\_UTRA\_FDD}$ defined in section 8.1.2.4.1.2 provided the timing to that cell has not changed more than ± 32 chips while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.1.2.4.1.2.3 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2.4.1.2.2 Event Triggered Reporting.

8.1.2.4.2 E-UTRAN TDD – UTRAN FDD measurements

The requirements in section 8.1.2.4.1 also apply for this section.

8.1.2.4.2.1 E-UTRAN TDD – UTRAN FDD measurements when no DRX is used

8.1.2.4.2.2 E-UTRAN TDD – UTRAN FDD measurements when DRX is used

8.1.2.4.3 E-UTRAN TDD – UTRAN TDD measurements

8.1.2.4.3.1 E-UTRAN TDD – UTRAN TDD measurements when no DRX is used

8.1.2.4.3.1.1 Identification of a new UTRA TDD cell

When explicit neighbour list is provided and no DRX is used the UE shall be able to identify a new detectable cell belonging to the monitored set within

$$\mathrm{T}_{\text{identify, UTRA\_TDD}} = Max\left\{5000, \mathrm{T}_{\text{basic identify UTRA\_TDD}} \cdot \frac{480}{\mathrm{T}_{\text{inter1}}} \cdot N_{Freq}\right\} ms$$

If the UE does not require transmit gap to perform inter-RAT UTRA TDD measurements, the UE shall be able to identify a new detectable inter-RAT UTRA TDD cell belonging to the monitored set within 5000 ms.

A cell shall be considered detectable when

- P-CCPCH Ec/Io $\geq$ -8 dB,
- DwPCH_Ec/Io $\geq$ -5 dB.

When L3 filtering is used an additional delay can be expected.

8.1.2.4.3.1.2 UE UTRA TDD P-CCPCH RSCP measurement capability

When measurement gaps are scheduled for UTRA TDD inter RAT measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in Section 9.3 with measurement period given by

$$\mathrm{T}_{\text{measurement UTRA\_TDD}} = Max\left\{\mathrm{T}_{\text{Measurement\_Period UTRA\_TDD}}, \mathrm{T}_{\text{basic measurement UTRA\_TDD}} \cdot \frac{480}{\mathrm{T}_{\text{inter1}}} \cdot N_{Freq}\right\} ms$$

If the UE does not need measurement gaps to perform UTRA TDD measurements, the measurement period for UTRA TDD measurements is 480 ms.

The UE shall be capable of performing UTRA TDD P-CCPCH RSCP measurements for $X_{\text{basic measurementUTRA\_TDD}}$ inter-frequency cells per TDD frequency of the monitored set and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{\text{Measurement\_ UTRA\_TDD.}}$

$X_{\text{basic measurementUTRA\_TDD}} = 6$

$T_{\text{Measurement\_Period UTRA\_TDD}}$ = 480 ms is the period used for calculating the measurement period $T_{\text{measurement\_UTRA\_TDD}}$ for UTRA TDD P-CCPCH RSCP measurements.

$T_{\text{basic\_identify\_UTRA\_TDD}}$ = 800 ms is the time period used in the inter RAT equation where the maximum allowed time for the UE to identify a new UTRA TDD cell is defined.

$T_{\text{basic\_measurement\_UTRA\_TDD}}$ = 50 ms is the time period used in the equation for defining the measurement period for inter RAT P-CCPCH RSCP measurements.

N_{freq} is defined in section 8.1.2.1.1 and T_{inter1} is defined in section 8.1.2.1

8.1.2.4.3.1.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.4.3.1.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify,\ UTRA\_TDD}$ defined in Section 8.1.2.4.3.1.1 When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify,\ UTRA\_TDD}$ defined in section 8.1.2.4.3.1.1 for the minimum requirements and then enters or leaves the reporting range, the event triggered measurement reporting delay shall be less than $T_{measurement\_UTRA\_TDD}$ defined in section 8.1.2.4.3.1.2 provided the timing to that cell has not changed more than ± [10] chips while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.1.2.4.3.1.5 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2.4.3.1.4 Event Triggered Reporting.

8.1.2.4.3.2 E-UTRAN TDD – UTRAN TDD measurements when DRX is used

When explicit neighbour list is provided and DRX is used the UE shall be able to identify a new detectable cell belonging to the neighbour cell list within $T_{identify,UTRA\_TDD}$ as shown in table 8.1.2.4.3.2-1

Table 8.1.2.4.3.2-1: Requirement to identify a newly detectable UTRA TDD cell

DRX cycle length (s)	$T_{identify\_UTRA\_TDD}$ (s) (DRX cycles)	
	Gap period = 40 ms	Gap period = 80 ms
≤0.32	Non DRX Requirements in section 8.1.2.4.3.1 are applicable	Non DRX Requirements in section 8.1.2.4.3.1 are applicable
0.32<DRX-cycle≤0.512	Note (20* Nfreq)	Note (25* Nfreq)
0.512<DRX-cycle≤2.56	Note (20* Nfreq)	Note (20* Nfreq)
Note: Time depends upon the DRX cycle in use		

A cell shall be considered detectable provided following conditions are fulfilled: A cell shall be considered detectable when

- P-CCPCH Ec/Io $\geq$ -8 dB,
- DwPCH_Ec/Io $\geq$ -5 dB.

When L3 filtering is used an additional delay can be expected.

The UE shall be capable of performing UTRA TDD P-CCPCH RSCP measurements of at least 6 UTRA cells per UTRA TDD carrier for up to 3 UTRA TDD carriers and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period defined in table 8.1.2.4.3.2-2.

Table 8.1.2.4.3.2-2: Requirement to measure UTRA TDD cells

DRX cycle length (s)	$T_{measure\_UTRA\_TDD}$ (s) (DRX cycles)	
	Gap period = 40 ms	**Gap period = 80 ms**
≤0.04	Non DRX Requirements in section 8.1.2.4.3.1 are applicable	Non DRX Requirements in section 8.1.2.4.3.1 are applicable
0.064	$0.48*N_{freq}$ ($7.5*N_{freq}$)	$0.8*N_{freq}$ ($12.5*N_{freq}$)
0.08	$0.48*N_{freq}$ ($6*N_{freq}$)	0. $8*N_{freq}$ ($10*N_{freq}$)
0.128	$0.64*N_{freq}$ ($5*N_{freq}$)	0. $8*N_{freq}$ ($6.25*N_{freq}$)
0. 128<DRX-cycle≤2.56	Note ($5*N_{freq}$)	Note ($5*N_{freq}$)
Note: Time depends upon the DRX cycle in use		

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.

8.1.2.4.3.2.1 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.4.3.2.2 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify,\ UTRA\_TDD}$ defined in Section 8.1.2.4.3.2 When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify,\ UTRA\_TDD}$ defined in section 8.1.2.4.3.2 and then enters or leaves the reporting range, the event triggered measurement reporting delay shall be less than $T_{measurement\_UTRA\_TDD}$ defined in section 8.1.2.4.3.2 provided the timing to that cell has not changed more than ± [10] chips while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.1.2.4.3.2.3 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2.4.3.2.2 Event Triggered Reporting.

8.1.2.4.4 E-UTRAN FDD – UTRAN TDD measurements

The requirements in section 8.1.2.4.3 also apply for this section.

8.1.2.4.5 E-UTRAN FDD – GSM measurements

8.1.2.4.5.1 E-UTRAN FDD – GSM measurements when no DRX is used

The requirements in this section apply only to UE supporting E-UTRAN FDD and GSM.

Measurements on GSM cells can be requested with BSIC verified.

In RRC_CONNECTED state when a supported measurement gap pattern sequence according to Table 8.1.2.1-1 is configured by E-UTRAN the UE shall continuously measure GSM cells, search for new GSM cells given in the monitored set and re-confirm the BSIC for already detected cells.

8.1.2.4.5.1.1 GSM carrier RSSI

This measurement shall be based on measurement gaps allocated for GSM carrier RSSI measurement as described in section 8.1.2.1. A UE supporting GSM measurements shall measure minimum number of 10 GSM carrier RSSI measurement samples ($N_{GSM\ carrier\ RSSI}$) per measurement gap. In RRC_CONNECTED state the measurement period, $T_{Measurement\ Period,\ GSM}$, for the GSM carrier RSSI measurement is N_{freq}*480 ms. The parameter N_{freq} is defined in section 8.1.2.1.1.

The UE shall meet the measurement accuracy requirements stated for RXLEV in [8], when the given measurement time allows the UE to take at least 3 GSM carrier RSSI samples per GSM carrier in the monitored set during the measurement period.

In case the UE is not able to acquire the required number of samples per GSM carrier during one measurement period, the UE shall measure as many GSM carriers as possible during that measurement period using at least 3 samples per GSM carrier. The GSM carriers that were not measured during that measurement period shall be measured in the following measurement periods.

8.1.2.4.5.1.2 BSIC verification

Measurements on a GSM cell can be requested with BSIC verified. The UE shall be able to report the GSM cells with BSIC verified for those cells where the verification of BSIC has been successful.

The procedure for BSIC verification on a GSM cell can be divided into the following two tasks:

- **Initial BSIC identification:** Includes searching for the BSIC and decoding the BSIC for the first time when there is no knowledge about the relative timing between the E-UTRAN FDD and GSM cells. The UE shall trigger the initial BSIC identification within the available measurement gap pattern sequence. The requirements for BSIC re-confirmation can be found in section 8.1.2.4.5.1.2.1.

- **BSIC re-confirmation:** Tracking and decoding the BSIC of a GSM cell after initial BSIC identification is performed. The UE shall trigger the BSIC re-confirmation within the available measurement gap pattern. The requirements for BSIC re-confirmation can be found in section 8.1.2.4.5.1.2.2.

If the network requests measurements on a GSM cell, the UE shall behave as follows:

- The UE shall perform GSM carrier RSSI measurements according to section 8.1.2.4.5.1 when a measurement gap pattern sequence is activated.

- The UE shall perform measurement reporting as defined in [2].

- The UE shall perform BSIC identification. The UE shall use the most recently available GSM carrier RSSI measurement results for arranging GSM cells in signal strength order for performing BSIC identification.

- The UE shall perform BSIC re-confirmation on all the GSM cells that have been successfully identified.

- The UE shall perform all configured event evaluation for event-triggered reporting after the BSIC has been verified for a GSM cell. The UE shall use the most recently available GSM carrier RSSI measurement results in event evaluation and event-triggered reporting.

- Event-triggered and periodic reports shall be triggered according to [2].

The BSIC of a GSM cell is considered to be "verified" if the UE has decoded the SCH of the BCCH carrier and identified the BSIC at least one time (initial BSIC identification). Once a GSM cell has been identified the BSIC shall be re-confirmed at least once every 8*$T_{re\text{-}confirm,GSM}$ seconds. Otherwise the BSIC of the GSM cell is considered as "non-verified". If a measurement gap pattern sequence is deactivated by the network after BSIC has been identified or verified, the UE shall consider the BSIC as non-verified.

$T_{identify,GSM}$ indicates the maximum time allowed for the UE to decode the unknown BSIC of the GSM cell in one GSM BCCH carrier in the initial BSIC identification procedure.

$T_{re\text{-}confirm,GSM}$ indicates the maximum time allowed for the re-confirmation of the BSIC of one GSM cell in the BSIC re-confirmation procedure.

The UE shall be able to decode a BSIC within a measurement gap when the time difference between the middle of the received GSM synchronisation burst at the UE and the middle of the effective measurement gap is within the limits specified in table 8.1.2.4.5.1.2-1.

Table 8.1.2.4.5.1.2-1: The gap length and maximum time difference for BSIC verification

Gap length [ms]	Maximum time difference [µs]
6	± 2350 µs

The UE shall be able to perform BSIC verification at levels down to the reference sensitivity level or reference interference levels as specified in [9].

8.1.2.4.5.1.2.1 Initial BSIC identification

This measurement shall be based on the measurement gaps used for Initial BSIC identification as described in section 8.1.2.4.5.1.2.

The UE shall continuously attempt to decode the BSIC of SCH on the BCCH carrier of the 8 strongest BCCH carriers of the GSM cells indicated in the Inter-RAT cell info list. The UE shall give priority for BSIC decoding attempts in decreasing signal strength order to BCCH carriers with unknown BSIC. The strongest BCCH carrier is defined as the BCCH carrier having the highest measured GSM carrier RSSI value.

If the BSIC of the GSM BCCH carrier has been successfully decoded the UE shall immediately continue BSIC identification with the next GSM BCCH carrier, in signal strength order, with unknown BSIC. The GSM cell for which the BSIC has been successfully identified shall be moved to the BSIC re-confirmation procedure.

If the UE has not successfully decoded the BSIC of the GSM BCCH carrier within $T_{identify,GSM}$ ms, the UE shall abort the BSIC identification attempts for that GSM BCCH carrier. The UE shall continue to try to perform BSIC identification of the next GSM BCCH carrier in signal strength order. The GSM BCCH carrier for which the BSIC identification failed shall not be re-considered for BSIC identification until BSIC identification attempts have been made for all the rest of the 8 strongest GSM BCCH carriers in the monitored set with unknown BSIC.

$T_{identify,GSM}$ values are given for a set of reference gap patterns in table 8.1.2.4.5.1.2.1-1. The requirements in the table represent the time required to guarantee at least two attempts to decode the BSIC for one GSM BCCH carrier.

Table 8.1.2.4.5.1.2.1-1

Number of carriers other than GSM	$T_{identify,gsm}$(ms)		$T_{reconfirm,gsm}$(ms)	
	40ms gap configuration (ID 0)	80ms gap configuration (ID 1)	40ms gap configuration (ID 0)	80ms gap configuration (ID 1)
0	2160	5280	1920	5040
1	5280	21760	5040	17280
2	5280	31680	5040	29280
3	19440	No	13320	No

		requirement		requirement
4	31680	No requirement	29280	No requirement
5	31680	No requirement	29280	No requirement

8.1.2.4.5.1.2.2 BSIC re-confirmation

The UE shall maintain the timing information of up to 8 identified GSM cells. Initial timing information is obtained from the initial BSIC identification. The timing information shall be updated every time the BSIC is decoded.

For each measurement gap used for GSM BSIC reconfirmation as described in section 8.1.2.4.5.1.2, the UE shall attempt to decode the BSIC falling within the measurement gap according to table 8.1.2.4.5.1.2.1-1. If more than one BSIC can be decoded within the same measurement gap, priority shall be given to the least recently decoded BSIC.

If the UE fails to decode the BSIC after two successive attempts or if the UE has not been able to re-confirm the BSIC for a GSM cell within $T_{re-confirm,GSM}$ seconds, the UE shall abort the BSIC re-confirmation attempts for that GSM cell. The GSM cell shall be treated as a new GSM cell with unidentified BSIC and the GSM cell shall be moved to the initial BSIC identification procedure, see section 8.1.2.4.5.1.2.1.

8.1.2.4.5.1.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.4.5.1.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH.

The event triggered reporting delay requirement is valid when the UE for each GSM carrier in the monitored set can take the required number of samples during the measurement period $T_{Measurement\ Period,\ GSM}$ (see section 8.1.2.4.5.1).

The event triggered measurement reporting delay for a GSM cell with verified BSIC , measured without L3 filtering shall be less than $2*T_{Measurement\ Period,\ GSM}$, where $T_{Measurement\ Period,\ GSM}$ is defined in section 8.1.2.4.5.1. When L3 filtering is used an additional delay can be expected.

8.1.2.4.5.1.5 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2.4.5.1.4 Event Triggered Reporting.

8.1.2.4.5.2 E-UTRAN FDD – GSM measurements when DRX is used

The requirements in this section apply only to UE supporting E-UTRAN FDD and GSM.

Measurements on GSM cells can be requested with BSIC verified.

In RRC_CONNECTED state when a supported measurement gap pattern sequence according to Table 8.1.2.1-1 is configured by E-UTRAN the UE shall continuously measure GSM cells, search for new GSM cells given in the monitored set and re-confirm the BSIC for already detected cells. During DRX periods the UE may use other periods of time outside the specified measurement gap patterns. The UE is not required to make measurements of GSM cells during DRX periods if a measurement gap pattern has not been configured.

8.1.2.4.5.2.1 GSM carrier RSSI

This measurement shall be based on measurement gaps allocated for GSM carrier RSSI measurement as described in section 8.1.2.1. A UE supporting GSM measurements shall measure minimum number of 10 GSM carrier RSSI measurement samples ($N_{GSM\ carrier\ RSSI}$) per DRX cycle. In RRC_CONNECTED state the measurement period, $T_{Measurement\ Period,\ GSM}$, for the GSM carrier RSSI measurement is shown in table 8.1.2.4.5.2.1-1. The parameter N_{freq} is defined in section 8.1.2.1.1.

Table 8.1.2.4.5.2.1-1: GSM measurement period for large DRX

DRX cycle length (s)	$T_{measure,GSM}$ (s) (DRX cycles)
≤0.04	Non DRX Requirements are applicable
0.04<DRX-cycle≤ 0.08	Note ($6*N_{freq}$)
0.08<DRX-cycle≤ 2.56	Note ($5*N_{freq}$)
Note: Time depends upon the DRX cycle in use	

The UE shall meet the measurement accuracy requirements stated for RXLEV in [8], when the given measurement time allows the UE to take at least 3 GSM carrier RSSI samples per GSM carrier in the monitored set during the measurement period.

In case the UE is not able to acquire the required number of samples per GSM carrier during one measurement period, the UE shall measure as many GSM carriers as possible during that measurement period using at least 3 samples per GSM carrier. The GSM carriers that were not measured during that measurement period shall be measured in the following measurement periods.

8.1.2.4.5.2.2 BSIC verification

Measurements on a GSM cell can be requested with BSIC verified. The UE shall be able to report the GSM cells with BSIC verified for those cells where the verification of BSIC has been successful.

The procedure for BSIC verification on a GSM cell can be divided into the following two tasks:

- **Initial BSIC identification:** Includes searching for the BSIC and decoding the BSIC for the first time when there is no knowledge about the relative timing between the E-UTRAN FDD and GSM cells.

- **BSIC re-confirmation:** Tracking and decoding the BSIC of a GSM cell after initial BSIC identification is performed. The UE shall trigger the BSIC re-confirmation within the available measurement gap pattern

If the network requests measurements on a GSM cell, the UE shall behave as follows:

- The UE shall perform GSM carrier RSSI measurements according to section 8.1.2.4.5.2.1 when a measurement gap pattern sequence is activated.

- The UE shall perform measurement reporting as defined in [2].

- The UE shall perform BSIC identification if BSIC verified measurements are activated by RRC. The UE shall use the most recently available GSM carrier RSSI measurement results for arranging GSM cells in signal strength order for performing BSIC identification.

- The UE shall perform BSIC re-confirmation on all the GSM cells that have been successfully identified.

- The UE shall perform all configured event evaluation for event-triggered reporting after the BSIC has been verified for a GSM cell. The UE shall use the most recently available GSM carrier RSSI measurement results in event evaluation and event-triggered reporting.

- Event-triggered and periodic reports shall be triggered according to [2].

The BSIC of a GSM cell is considered to be “verified” if the UE has decoded the SCH of the BCCH carrier and identified the BSIC at least one time (initial BSIC identification). Once a GSM cell has been identified the BSIC shall be re-confirmed at least once every 30 seconds. Otherwise the BSIC of the GSM cell is considered as "non-verified".

The UE shall be able to perform BSIC verification at levels down to the reference sensitivity level or reference interference levels as specified in [9].

8.1.2.4.5.2.2.1 Initial BSIC identification

This measurement shall be made on GSM cells that are requested with BSIC verified.

For DRX cycle length ≤ 40 ms, the initial GSM BSIC identification requirements corresponding to the non DRX requirements as specified in section 8.1.2.4.5.1.2.1 shall apply.

For DRX cycle length > 40 ms, the UE shall make at least one attempt every N_{freq}*30s to decode the BSIC of SCH on the BCCH carrier of the 8 strongest BCCH carriers of the GSM cells indicated in the Inter-RAT cell info list. If the UE has not successfully decoded the BSIC of the GSM BCCH carrier within N_{freq}*60 s, the UE shall abort the BSIC identification attempts for that GSM BCCH carrier. The UE shall give priority for BSIC decoding attempts in decreasing signal strength order to BCCH carriers with unknown BSIC. The strongest BCCH carrier is defined as the BCCH carrier having the highest measured GSM carrier RSSI value. The parameter N_{freq} is defined in section 8.1.2.1.1.

If the BSIC of the GSM BCCH carrier has been successfully decoded the UE shall continue BSIC identification with the next GSM BCCH carrier, in signal strength order, with unknown BSIC. The GSM cell for which the BSIC has been successfully identified shall be moved to the BSIC re-confirmation procedure.

8.1.2.4.5.2.2.2 BSIC re-confirmation

The UE shall maintain the timing information of up to 8 identified GSM cells. Initial timing information is obtained from the initial BSIC identification. The timing information shall be updated every time the BSIC is decoded.

For DRX cycle length ≤ 40 ms, the GSM BSIC re-conformation requirements corresponding to the non DRX requirements as specified in section 8.1.2.4.5.1.2.2 shall apply.

For DRX cycle length > 40 ms, at least every N_{freq}*30 seconds, the UE shall attempt to decode the BSIC of each identified GSM cell.If the UE fails to decode the BSIC after two successive attempts or if the UE has not been able to re-confirm the BSIC for a GSM cell within N_{freq}*60 seconds, the UE shall abort the BSIC re-confirmation attempts for that GSM cell. The GSM cell shall be treated as a new GSM cell with unidentified BSIC and the GSM cell shall be moved to the initial BSIC identification procedure, see section 8.1.2.4.5.2.2.1. The parameter N_{freq} is defined in section 8.1.2.1.1.

8.1.2.4.5.2.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in section 9.

8.1.2.4.5.2.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH.

The event triggered reporting delay requirement is valid when the UE for each GSM carrier in the monitored set can take the required number of samples during the measurement period $T_{\text{Measurement Period, GSM}}$ (see section 8.1.2.4.5.2.1).

The event triggered measurement reporting delay for a GSM cell with verified BSIC , measured without L3 filtering shall be less than 2*$T_{\text{Measurement Period, GSM}}$, where $T_{\text{Measurement Period, GSM}}$ is defined in section 8.1.2.4.5.2.1. When L3 filtering is used an additional delay can be expected.

8.1.2.4.5.2.5 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2.4.5.2.4 Event Triggered Reporting.

8.1.2.4.6 E-UTRAN TDD – GSM measurements

The requirements in section 8.1.2.4.5 also apply for this section.

8.1.2.4.7 E-UTRAN FDD – UTRAN FDD measurements for SON

8.1.2.4.7.1 Identification of a new UTRA FDD cell for SON

No explicit neighbour list is provided to the UE for identifying a UTRA cell for SON. The UE shall identify and report only the strongest cell when requested by the network for the purpose of SON.

8.1.2.4.7.1.1 Requirements when no DRX is used

When no DRX is used the UE shall be able to identify a new cell within:

$$\mathrm{T}_{\text{identify, UTRA\_FDD}} = \mathrm{T}_{\text{basic\_identify\_UTRA\_FDD}} \cdot \frac{480}{\text{Tinter1}} \cdot N_{Freq} \quad ms$$

$T_{\text{basic\_identify\_UTRA\_FDD}}$ = 300 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

A cell shall be considered identifiable following conditions are fulfilled:

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io $\geq$ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

If the UE is unable to identify the UTRA cell for SON within 8*$T_{\text{identify, UTRA\_FDD}}$ ms, the UE may stop searching UTRA cells for SON.

8.1.2.4.7.1.2 Requirements when DRX is used

When DRX is used the UE shall be able to identify a new cell within $T_{\text{identify, UTRA\_FDD}}$ as defined in table 8.1.2.4.7.1.2-1.

Table 8.1.2.4.7.1.2-1: Requirement to identify a new UTRA FDD cell for SON

DRX cycle length (s)	$T_{\text{identify, UTRA\_FDD}}$ (s) (DRX cycles)	
	Gap period = 40 ms	Gap period = 80 ms
≤0.04	Non DRX Requirements in section 8.1.2.4.7.1.1 are applicable	Non DRX Requirements in section 8.1.2.4.7.1.1are applicable
0.04<DRX cycle≤0.08	Note (45* N_{freq})	Note (95* N_{freq})
0.128	3.84* N_{freq} (30* N_{freq})	8.0* N_{freq} (62.5* N_{freq})
0.16	4.0* N_{freq} (25* N_{freq})	8.0* N_{freq} (50* N_{freq})
0.256	6.4* N_{freq} (25* N_{freq})	8.96* N_{freq} (35* N_{freq})
0.32	8* N_{freq} (25* N_{freq})	8.96* N_{freq} (28* N_{freq})
0.32<DRX cycle≤2.56	Note (25* N_{freq})	Note (25* N_{freq})
Note: Time depends upon the DRX cycle in use		

A cell shall be considered identifiable provided following conditions are fulfilled:

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io $\geq$ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

If the UE is unable to identify the UTRA cell for SON within $8*T_{identify, UTRA\_FDD}$ seconds, the UE may stop searching UTRA cells for SON; $T_{identify, UTRA\_FDD}$ is defined in table 8.1.2.4.7.1.2-1.

8.1.2.4.7.1.3 Reporting Delay

The UE shall not report the physical cell identity of an identifiable cell for SON as long as the reporting criteria are not fulfilled.

The reporting delay is defined as the time between the identification of the strongest cell for SON until the UE starts to transmit its physical cell identity over the Uu interface. This requirement assumes that the reporting of the physical cell identity is not delayed by other RRC signalling on the DCCH. This reporting delay excludes a delay uncertainty resulted when inserting the physical cell identity of the strongest cell for SON to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This reporting delay excludes any delay caused by unavailability of UL resources for UE sending the physical cell identity of the strongest cell for SON.

The reporting delay of the physical cell identity of the strongest cell for SON without L3 filtering shall be less than $T_{identify, UTRA\_FDD}$ defined in section 8.1.2.4.7.1.1 and in section 8.1.2.4.7.1.2 for non DRX and DRX cases respectively. When L3 filtering is used an additional delay can be expected.

8.1.2.4.8 E-UTRAN TDD – UTRAN FDD measurements for SON

The requirements in section 8.1.2.4.7 also apply for this section.

8.1.2.4.9 E-UTRAN FDD – cdma2000 1xRTT measurements

UE shall perform cdma2000 1xRTT measurements according to the procedure defined in [15] on the cdma2000 1xRTT neighbor cells indicated by the serving eNode B. If measurement gaps are required, the UE shall perform cdma2000 1xRTT measurements only during the measurement gaps configured by the serving eNode B.

8.1.2.4.9.1a E-UTRAN FDD – cdma2000 1xRTT measurements when no DRX is used

When measurement gaps are scheduled for CDMA2000 1xRTT inter RAT measurements, the UE physical layer shall be capable of reporting CDMA2000 1xRTT Pilot Strength measurements to higher layers with measurement accuracy as specified in Section 9.5, corresponding to a 90% measurement success rate, with measurement period given by

$$\mathrm{T}_{\mathrm{measurement\_CDMA2000\_1x}} = \mathrm{T}_{\mathrm{basic\_measurement\_CDMA2000\_1x}} \cdot N_{Freq} \cdot S_{gap}$$

where $T_{basic\_measurement\_CDMA2000\_1x}$ = 100 ms and the measurement gap specific scale factor S_{gap} is based on the measurement gap pattern in use as defined in Table 8.1.2.4.9.1-1.

Table 8.1.2.4.9.1-1: Gap Pattern Specific Scale Factor

Gap Pattern Id	S_{gap}
0	32/3
1	64/3

If the UE does not need measurement gaps to perform CDMA2000 1xRTT Pilot Strength measurements, the measurement period is given by

$$\mathrm{T}_{\mathrm{measurement\_CDMA2000\_1x}} = \mathrm{T}_{\mathrm{basic\_measurement\_CDMA2000\_1x}} \cdot N_{Freq} .$$

8.1.2.4.9.1 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in section 9.

The measurement reporting delay of each periodic report is defined as the time between the end of the last measurement period and the moment when the UE starts to transmit the measurement report over the Uu interface. This delay shall be less than T_{71m} defined in [15] for each periodic report. This measurement reporting delay excludes a delay which is caused by the unavailability of the uplink resources for the UE to send the measurement report.

8.1.2.4.10 E-UTRAN TDD – cdma2000 1xRTT measurements

The requirements in section 8.1.2.4.9 also apply for this section.

8.1.2.4.11 E-UTRAN FDD – HRPD measurements

UE shall perform HRPD measurements according to the procedure defined in [11] on the HRPD neighbor cells indicated by the serving eNode B. If measurement gaps are required, the UE shall perform HRPD measurements only during the measurement gaps configured by the serving eNode B.

8.1.2.4.12 E-UTRAN TDD – HRPD measurements

The requirements in section 8.1.2.4.11 also apply for this section.

8.1.2.4.13 E-UTRAN TDD – UTRAN TDD measurements for SON

8.1.2.4.13.1 Identification of a new UTRA TDD cell for SON

No explicit neighbour list is provided to the UE for identifying a UTRA TDD cell for SON. The UE shall identify and report only the strongest cell when requested by the network for the purpose of SON.

8.1.2.4.13.1.1 Requirements when no DRX is used

When no DRX is used the UE shall be able to identify a new cell within:

$$T_{\text{identify, UTRA\_TDD}} = T_{\text{basic\_identify\_UTRA\_TDD}} \cdot \frac{480}{T_{\text{inter1}}} \cdot N_{Freq} \quad ms$$

$T_{\text{basic\_identify\_UTRA\_TDD}}$ = 800 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new UTRA TDD cell is defined.

A cell shall be considered identifiable following conditions are fulfilled:

- P-CCPCH Ec/Io $\geq$ -8 dB,
- DwPCH_Ec/Io $\geq$ -5 dB.

When L3 filtering is used an additional delay can be expected.

If the UE is unable to identify the UTRA TDD cell for SON within 8*$T_{\text{identify, UTRA\_TDD}}$ ms, the UE may stop searching UTRA TDD cells for SON.

8.1.2.4.13.1.2 Requirements when DRX is used

When DRX is used the UE shall be able to identify a new cell within $T_{\text{identify, UTRA\_TDD}}$ as defined in table 8.1.2.4.13.1.2-1.

Table 8.1.2.4.13.1.2-1: Requirement to identify a new UTRA TDD cell for SON

DRX cycle length (s)	**$T_{\text{identify, UTRA\_TDD}}$ (s) (DRX cycles)**	
	Gap period = 40 ms	**Gap period = 80 ms**
≤0.16	Non DRX Requirements in section 8.1.2.4.3.1 are applicable	Non DRX Requirements in section 8.1.2.4.3.1 are applicable
0.16<DRX cycle≤0.256	Note (25* N_{freq})	Note (50* N_{freq})
0.256<DRX cycle≤0.32	**Note (25* N_{freq})**	**Note (45* N_{freq})**
0.32<DRX cycle≤2.56	**Note (25* N_{freq})**	Note (25* N_{freq})
Note: Time depends upon the DRX cycle in use		

A cell shall be considered identifiable provided following conditions are fulfilled:

- P-CCPCH Ec/Io $\geq$ -8 dB,
- DwPCH_Ec/Io $\geq$ -5 dB.

When L3 filtering is used an additional delay can be expected.

If the UE is unable to identify the UTRA TDD cell for SON within 8*$T_{identify,\ UTRA\_TDD}$ seconds, the UE may stop searching UTRA TDD cells for SON; $T_{identify,\ UTRA\_TDD}$ is defined in table 8.1.2.4.13.1.2-1.

8.1.2.4.13.1.3 Reporting Delay

The UE shall not report the physical cell identity of an identifiable cell for SON as long as the reporting criteria are not fulfilled.

The reporting delay is defined as the time between the identification of the strongest cell for SON until the UE starts to transmit its physical cell identity over the Uu interface. This requirement assumes that the reporting of the physical cell identity is not delayed by other RRC signalling on the DCCH. This reporting delay excludes a delay uncertainty resulted when inserting the physical cell identity of the strongest cell for SON to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This reporting delay excludes any delay caused by unavailability of UL resources for UE sending the physical cell identity of the strongest cell for SON.

The reporting delay of the physical cell identity of the strongest cell for SON without L3 filtering shall be less than $T_{identify,\ UTRA\_TDD}$ defined in section 8.1.2.4.13.1.1 and in section 8.1.2.4.13.1.2 for non DRX and DRX cases respectively. When L3 filtering is used an additional delay can be expected.

8.1.2.4.14 E-UTRAN FDD – UTRAN TDD measurements for SON

The requirements in section 8.1.2.4.13 also apply for this section.

8.2 Capabilities for Support of Event Triggering and Reporting Criteria

8.2.1 Introduction

This section contains requirements on UE capabilities for support of event triggering and reporting criteria. As long as the measurement configuration does not exceed the requirements stated in section 8.2.2, the UE shall meet the performance requirements defined in section 9.

The UE can be requested to make measurements under different measurement identities defined in 3GPP TS 36.331 [2]. Each measurement identity corresponds to either event based reporting, periodic reporting or no reporting. In case of event based reporting, each measurement identity is associated with an event. In case of periodic reporting, a measurement identity is associated with one periodic reporting criterion. In case of no reporting, a measurement identity is associated with one no reporting criterion.

The purpose of this section is to set some limits on the number of different event, periodic and no reporting criteria the UE may be requested to track in parallel.

8.2.2 Requirements

In this section a reporting criterion corresponds to either one event (in the case of event based reporting), or one periodic reporting criterion (in case of periodic reporting), or one no reporting criterion (in case of no reporting). For event based reporting, each instance of event, with the same or different event identities, is counted as separate reporting criterion in table 8.2.2-1.

The UE shall be able to support in parallel per category up to E_{cat} reporting criteria according to table 8.2.2-1. For the measurement categories belonging to measurements on: E-UTRA intra-frequency cells, E-UTRA inter frequency cells, and inter-RAT per supported RAT, the UE need not support more than 21 reporting criteria in total.

Table 8.2.2-1: Requirements for reporting criteria per measurement category

Measurement category	E_{cat}	Note
Intra-frequency	9	E-UTRA intra-frequency cells
Inter-frequency	7	E-UTRA inter-frequency cells
Inter-RAT (E-UTRAN FDD or TDD, UTRAN FDD, UTRAN TDD, GSM, cdma2000 1 x RTT and HRPD)	5	Only applicable for UE with this (inter-RAT) capability. This requirement ($\mathbf{E_{cat}}$ = 5) is per supported RAT.

9 Measurements performance requirements for UE

One of the key services provided by the physical layer is the measurements used to trigger or perform a multitude of functions. Both the UE and the E-UTRAN are required to perform measurements. The physical layer measurement model and a complete list of measurements are specified in [24] and [22] respectively. The physical layer measurements are described and defined in [4]. In this clause for each measurement the relevant requirements on the measurement period, reporting range, granularity and performance in terms of accuracy are specified.

Since the UE reference sensitivity requirements are different depending on supported band, this is noted in each case with definition of the range Io for each frequency band. Definitions of each frequency bands can be found in [5].

The accuracy requirements in this clause are applicable for AWGN radio propagation conditions and assume independent interference (noise) at each receiver antenna port.

9.1 E-UTRAN measurements

The requirements in this clause are applicable for a UE:

- in state RRC_CONNECTED
- performing measurements with appropriate measurement gaps as defined in Section 8.1.2.1.
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in [24].

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the higher layer filtering disabled.

9.1.2 Intra-frequency RSRP Accuracy Requirements

9.1.2.1 Absolute RSRP Accuracy

The absolute accuracy of RSRP is defined as the RSRP measured from a cell on the same frequency as that of the serving cell.

The accuracy requirements in Table 9.1.2.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Section 7.3 for reference sensitivity are fulfilled.

RSRP|dBm≥ -127 dBm for Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40,

RSRP|dBm≥ -126 dBm for Bands 9,

$RSRP|_{dBm}$≥ -125 dBm for Bands 2, 5, 7, RSRP$|_{dBm}$≥ -124 dBm for Bands 3, 8, 12, 13, 14, 17.

Table 9.1.2.1-1: RSRP Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7	Bands 3, 8, 12, 13, 14, 17	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot ≥ -6 dB	dBm	±6	±9	-121dBm/15kHz … -70dBm/ $BW_{Channel}$	-119dBm/15kHz … -70dBm/ $BW_{Channel}$	-118dBm/15kHz … -70dBm/ $BW_{Channel}$	-120dBm/15kHz … -70dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±8	±11	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$
Note 1. Io is assumed to have constant EPRE across the bandwidth.							

9.1.2.2 Relative Accuracy of RSRP

The relative accuracy of RSRP is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on the same frequency.

The accuracy requirements in Table 9.1.2.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Section 7.3 for reference sensitivity are fulfilled.

RSRP1,2$|_{dBm}$≥ -127 dBm for Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40,

RSRP1,2$|_{dBm}$≥ -126 dBm for Bands 9,

RSRP1,2$|_{dBm}$≥ -125 dBm for Bands 2, 5, 7,

RSRP1,2$|_{dBm}$≥ -124 dBm for Bands 3, 8, 12, 13, 14, 17.

Table 9.1.2.2-1: RSRP Intra frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7	Bands 3, 8, 12, 13, 14, 17	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot > -3 dB	dBm	±2	±3	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±3	±3	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note 1. Io is assumed to have constant EPRE across the bandwidth. Note 2. The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells.to which the requirement applies.							

9.1.3 Inter-frequency RSRP Accuracy Requirements

9.1.3.1 Absolute RSRP Accuracy

The absolute accuracy of RSRP is defined as the RSRP measured from a cell that has different carrier frequency from the serving cell.

The accuracy requirements in Table 9.1.3.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Section 7.3 for reference sensitivity are fulfilled.

RSRP|dBm≥ -127 dBm for Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40,

RSRP|dBm≥ -126 dBm for Bands 9,

RSRP|dBm≥ -125 dBm for Bands 2, 5, 7,

RSRP|dBm≥ -124 dBm for Bands 3, 8, 12, 13, 14, 17.

Table 9.1.3.1-1: RSRP Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7	Bands 3, 8, 12, 13, 14, 17	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot ≥ -6 dB	dBm	±6	±9	-121dBm/15kHz … -70dBm/ $BW_{Channel}$	-119dBm/15kHz … -70dBm/ $BW_{Channel}$	-118dBm/15kHz … -70dBm/ $BW_{Channel}$	-120dBm/15kHz … -70dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±8	±11	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$
Note 1. Io is assumed to have constant EPRE across the bandwidth.							

9.1.3.2 Relative Accuracy of RSRP

The relative accuracy of RSRP in inter frequency case is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on a different frequency.

The accuracy requirements in Table 9.1.3.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Section 7.3 for reference sensitivity are fulfilled.

$RSRP1|_{dBm}$ ≥ -127 dBm if RSRP1 is on Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40,

$RSRP1|_{dBm}$ ≥ -126 dBm if RSRP1 is on Band 9,

$RSRP1|_{dBm}$ ≥ -125 dBm if RSRP1 is on Bands 2, 5, 7,

$RSRP1|_{dBm}$ ≥ -124 dBm if RSRP1 is on Bands 3, 8, 12, 13, 14, 17,

$RSRP2|_{dBm}$ ≥ -127 dBm if RSRP2 is on Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40

$RSRP2|_{dBm}$ ≥ -126 dBm if RSRP2 is on Band 9,

$RSRP2|_{dBm}$ ≥ -125 dBm if RSRP2 is on Bands 2, 5, 7,

$RSRP2|_{dBm} \geq -124$ dBm if RSRP2 is on Bands 3, 8, 12, 13, 14, 17.

$$\left| RSRP1|_{dBm} - RSRP2|_{dBm} \right| \leq 27dB$$

| Channel 1_Io -Channel 2_Io | ≤ 20 dB

Table 9.1.3.2-1: RSRP Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	RSRP is on Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39 and 40	RSRP is on Bands 2, 5, 7	RSRP is on Bands 3, 8, 12, 13, 14, 17	RSRP is on Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot > -6dB	dBm	±6	±6	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note 1. Io is assumed to have constant EPRE across the bandwidth. Note 2. The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells.to which the requirement applies.							

9.1.4 RSRP Measurement Report Mapping

The reporting range of RSRP is defined from -140 dBm to -44 dBm with 1 dB resolution.

The mapping of measured quantity is defined in Table 9.1.4-1. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.1.4-1: RSRP measurement report mapping

Reported value	Measured quantity value	Unit
RSRP_00	RSRP < -140	dBm
RSRP_01	-140 ≤ RSRP < -139	dBm
RSRP_02	-139 ≤ RSRP < -138	dBm
…	…	…
RSRP_95	-46 ≤ RSRP < -45	dBm
RSRP_96	-45 ≤ RSRP < -44	dBm
RSRP_97	-44 ≤ RSRP	dBm

9.1.5 Intra-frequency RSRQ Accuracy Requirements

9.1.5.1 Absolute RSRQ Accuracy

The absolute accuracy of RSRQ is defined as the RSRQ measured from a cell on the same frequency as that of the serving cell.

The accuracy requirements in Table 9.1.5.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Section 7.3 for reference sensitivity are fulfilled.

RSRP|dBm≥ -127 dBm for Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40,

RSRP|dBm≥ -126 dBm for Bands 9,

$RSRP|_{dBm} \geq -125$ dBm for Bands 2, 5, 7,

$RSRP|_{dBm} \geq -124$ dBm for Bands 3, 8, 12, 13, 14, 17,

Table 9.1.5.1-1: RSRQ Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7	Bands 3, 8, 12, 13, 14, 17	Band 9
				Io	Io	Io	Io
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 2.5	± 4	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 3.5	± 4	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note 1. Io is assumed to have constant EPRE across the bandwidth.							

9.1.6 Inter-frequency RSRQ Accuracy Requirements

9.1.6.1 Absolute RSRQ Accuracy

The absolute accuracy of RSRQ is defined as the RSRQ measured from a cell that has different carrier frequency from the serving cell.

The accuracy requirements in Table 9.1.6.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Section 7.3 for reference sensitivity are fulfilled.

RSRP|dBm≥ -127 dBm for Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40,

RSRP|dBm≥ -126 dBm for Bands 9,

$RSRP|_{dBm}$≥ -125 dBm for Bands 2, 5, 7,

$RSRP|_{dBm}$≥ -124 dBm for Bands 3, 8, 12, 13, 14, 17.

Table 9.1.6.1-1: RSRQ Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7	Bands 3, 8, 12, 13, 14, 17	Bands 9
				Io	Io	Io	Io
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 2.5	± 4	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 3.5	± 4	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note 1. Io is assumed to have constant EPRE across the bandwidth.							

9.1.6.2 Relative Accuracy of RSRQ

The relative accuracy of RSRQ in inter frequency case is defined as the RSRQ measured from one cell compared to the RSRQ measured from another cell on a different frequency.

The accuracy requirements in Table 9.1.6.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Section 7.3 for reference sensitivity are fulfilled.

$RSRP1|_{dBm} \geq$ -127 dBm if RSRP1 is on Band 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40,

$RSRP1|_{dBm} \geq$ -126 dBm if RSRP1 is on Band 9,

$RSRP1|_{dBm} \geq$ -125 dBm if RSRP1 is on Bands 2, 5, 7,

$RSRP1|_{dBm} \geq$ -124 dBm if RSRP1 is on Bands 3, 8, 12, 13, 14, 17,

$RSRP2|_{dBm} \geq$ -127 dBm if RSRP2 is on Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40,

$RSRP2|_{dBm} \geq$ -126 dBm if RSRP2 is on Band 9,

$RSRP2|_{dBm} \geq$ -125 dBm if RSRP2 is on Bands 2, 5, 7,

$RSRP2|_{dBm} \geq$ -124 dBm if RSRP2 is on Bands 3, 8, 12, 13, 14, 17.

$$\left| RSRP1|_{dBm} - RSRP2|_{dBm} \right| \leq 27dB$$

| Channel 1_Io -Channel 2_Io | ≤ 20 dB

Table 9.1.6.2-1: RSRQ Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	RSRQ is on Bands 1, 4, 6, 10, 11, 33, 34, 35, 36, 37, 38, 39, 40	RSRQ is on Bands 2, 5, 7	RSRQ is on Bands 3, 8, 12, 13, 14, 17	RSRQ is on Band 9
				Io	Io		
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 3	± 4	-121dBm/15kHz … -50dBm] / $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 4	± 4	-121dBm/15kHz … -50dBm] / $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note 1. Io is assumed to have constant EPRE across the bandwidth. Note 2. The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells.to which the requirement applies.							

9.1.7 RSRQ Measurement Report Mapping

The reporting range of RSRQ is defined from -19.5 dB to -3 with 0.5 dB resolution.

The mapping of measured quantity is defined in table 9.1.7-1. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.1.7-1: RSRQ measurement report mapping

Reported value	Measured quantity value	Unit
RSRQ_00	RSRQ < -19.5	dB
RSRQ_01	-19.5 ≤ RSRQ < -19	dB
RSRQ_02	-19 ≤ RSRQ < -18.5	dB
…	…	…
RSRQ_32	-4 ≤ RSRQ < -3.5	dB
RSRQ_33	-3.5 ≤ RSRQ < -3	dB
RSRQ_34	-3 ≤ RSRQ	dB

9.1.8 Power Headroom

The power headroom (PH), expressed in dB, is defined as the difference between the configured maximum UE output power (P_{CMAX}), which is defined in section 6.2.5 in TS 36.101 [5] and the estimated power for PUSCH transmission according to section 5.1.1.1 in TS 36.213 [3].

9.1.8.1 Period

The reported power headroom shall be estimated over 1 subframe. The power headroom shall be estimated only in a subframe where PUSCH is transmitted.

9.1.8.2 Reporting Delay

The power headroom reporting delay is defined as the time between the beginning of the power headroom reference period and the time when the UE starts transmitting the power headroom over the radio interface. The reporting delay of the power headroom shall be 0 ms, which is applicable for all configured triggering mechanisms for power headroom reporting.

9.1.8.3 Void

9.1.8.4 Report Mapping

The power headroom reporting range is from -23 ...+40 dB. Table 9.1.8.4-1 defines the report mapping.

Table 9.1.8.4-1: Power headroom report mapping

Reported value	Measured quantity value (dB)
POWER_HEADROOM_0	$-23 \le PH < -22$
POWER_HEADROOM_1	$-22 \le PH < -21$
POWER_HEADROOM_2	$-21 \le PH < -20$
POWER_HEADROOM_3	$-20 \le PH < -19$
POWER_HEADROOM_4	$-19 \le PH < -18$
POWER_HEADROOM_5	$-18 \le PH < -17$
…	…
POWER_HEADROOM_57	$34 \le PH < 35$
POWER_HEADROOM_58	$35 \le PH < 36$
POWER_HEADROOM_59	$36 \le PH < 37$
POWER_HEADROOM_60	$37 \le PH < 38$
POWER_HEADROOM_61	$38 \le PH < 39$
POWER_HEADROOM_62	$39 \le PH < 40$
POWER_HEADROOM_63	$PH \ge 40$

9.2 UTRAN FDD Measurements

The requirements in this clause are applicable for a UE:

- in state RRC_CONNECTED
- performing measurements according to section 8.1.2.4.1 with appropriate measurement gaps
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in 3GPP TS 25.302 [6].

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

9.2.1 UTRAN FDD CPICH RSCP

NOTE: This measurement is for handover between E-UTRAN and UTRAN FDD.

The requirements in this section are valid for terminals supporting this capability.

The measurement period for RRC_CONNECTED state is specified in section 8.1.2.4.1.

In RRC_CONNECTED state the accuracy requirements shall meet the absolute accuracy requirements in table 9.2.1-1,.

Table 9.2.1-1: UTRAN FDD CPICH_RSCP absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions of UTRAN carrier			
		Normal condition	Extreme condition	Band I, IV, VI, X and XI	Band II, V and VII	Band III, VIII, XII, XIII and XIV	Band IX
				Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
CPICH_RSCP	dBm	± 6	± 9	-94...-70	-92…-70	-91…-70	-93...-70
	dBm	± 8	± 11	-70...-50	-70…-50	-70…-50	-70...-50

If the UE, in RRC_CONNECTED state, needs measurement gaps to perform UTRAN FDD measurements, the UTRAN FDD measurement procedure and measurement gap pattern stated in section 8.1.2.4.1 shall apply.

The reporting range and mapping specified for FDD CPICH RSCP in 3GPP TS 25.133 [18] shall apply.

9.2.2 UTRAN FDD carrier RSSI

NOTE: This measurement is for handover between E-UTRAN and UTRAN FDD.

The requirements in this section are valid for terminals supporting this capability.

The measurement period for RRC_CONNECTED state is equal to the measurement period for FDD CPICH measurements, whose measurement period is specified in section 8.1.2.4.1.

In RRC_CONNECTED state the accuracy requirements shall be the same as the measurement accuracy requirements for FDD carrier RSSI in 3GPP TS 25.133 [18].

If the UE, in RRC_CONNECTED state, needs measurement gaps to perform UTRAN FDD measurements, the UTRAN FDD measurement procedure and measurement gap pattern stated in section 8.1.2.4.1 shall apply.

The reporting range and mapping specified for FDD carrier RSSI in 3GPP TS 25.133 [18] shall apply.

9.2.3 UTRAN FDD CPICH Ec/No

NOTE: This measurement is for handover between E-UTRAN and UTRAN FDD.

The requirements in this section are valid for terminals supporting this capability.

The measurement period for RRC_CONNECTED state is specified in section 8.1.2.4.1.

In RRC_CONNECTED state the accuracy requirements shall be the same as the inter-frequency measurement accuracy requirements for FDD CPICH Ec/No in 3GPP TS 25.133 [18].

If the UE, in RRC_CONNECTED state, needs measurement gaps to perform UTRAN FDD measurements, the UTRAN FDD measurement procedure and measurement gap pattern stated in section 8.1.2.4.1 shall apply.

The reporting range and mapping specified for FDD CPICH Ec/No in 3GPP TS 25.133 [18] shall apply.

9.3 UTRAN TDD Measurements

The requirements in this clause are applicable for a UE:

- in state RRC_CONNECTED
- performing measurements according to section 8.1.2.4.3 with appropriate measurement gaps
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in 3GPP TS 25.302 [6].

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

9.3.1 UTRAN TDD P-CCPCH RSCP

NOTE: This measurement is for handover between E-UTRAN and UTRAN TDD.

The requirements in this section are valid for terminals supporting this capability.

The measurement period for RRC_CONNECTED state is specified in section 8.1.2.4.3.

In RRC_CONNECTED state the accuracy requirements shall be the same as the inter-frequency measurement accuracy requirements for TDD P-CCPCH in 3GPP TS 25.123 [19].

If the UE, in RRC_CONNECTED state, needs measurement gaps to perform UTRAN TDD measurements, the UTRAN TDD measurement procedure and measurement gap pattern stated in section 8.1.2.4.3 shall apply.

The reporting range and mapping specified for TDD P-CCPCH RSCP in 3GPP TS 25.123 [19] shall apply.

9.3.2 UTRAN TDD carrier RSSI

NOTE: This measurement is for handover between E-UTRAN and UTRAN TDD.

The requirements in this section are valid for terminals supporting this capability.

The measurement period for RRC_CONNECTED state is equal to the measurement period for TDD P-CCPCH RSCP measurement, whose measurement period is specified in section 8.1.2.4.3.

In RRC_CONNECTED state the accuracy requirements shall be the same as the inter-frequency measurement accuracy requirements for TDD carrier RSSI in 3GPP TS 25.123 [19].

If the UE, in RRC_CONNECTED state, needs measurement gaps to perform UTRAN TDD measurements, the UTRAN TDD measurement procedure and measurement gap pattern stated in section 8.1.2.4.3 shall apply.

The reporting range and mapping specified for TDD carrier RSSI in 3GPP TS 25.123 [19] shall apply.

9.3.3 Void

9.4 GSM Measurements

The requirements in this clause are applicable for a UE:

- in state RRC_CONNECTED
- performing measurements according to section 8.1.2.4.5 with appropriate measurement gaps
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in 3GPP TS 25.302 [6].

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

9.4.1 GSM carrier RSSI

NOTE: This measurement is for handover between E-UTRAN and GSM.

The requirements in this section are valid for terminals supporting this capability.

The measurement period for RRC_CONNECTED state is specified in section 8.1.2.4.5.

In RRC_CONNECTED state the measurement accuracy requirements for RXLEV in TS 45.008 [8] shall apply.

If the UE, in RRC_CONNECED state, needs measurement gaps to perform GSM measurements, the GSM measurement procedure and measurement gap pattern stated in section 8.1.2.4.5 shall apply.

The reporting range and mapping specified for RXLEV in TS 45.008 [8] shall apply.

9.5 CDMA2000 1x RTT Measurements

The requirements in this clause are applicable for a UE:

- in RRC_CONNECTED state.
- synchronised to the cell that is measured.

9.5.1 CDMA2000 1x RTT Pilot Strength

NOTE: This measurement is for handover between E-UTRAN and cdma2000 1 x RTT.

The requirements in this section are valid for terminals supporting this capability.

CDMA2000 1xRTT Pilot Strength defined in sub-clause 5.1.10 of [4] shall meet the performance requirement defined in sub-clause 3.2.4 of [14] on the cdma2000 1xRTT neighbour cells indicated by the serving eNode B.

10 Measurements Performance Requirements for E-UTRAN

10.1 Received Interference Power

The measurement period shall be 100 ms.

10.1.1 Absolute accuracy requirement

Table 10.1.1-1: Received Interference Power absolute accuracy

Parameter	Unit	Accuracy [dB]	Conditions
			Iob [dBm/180 kHz]
Iob	dBm/180 kHz	± 4	-117 ... -96

10.1.2 Relative accuracy requirement

The relative accuracy is defined as the Received Interference Power measured at one frequency compared to the Received Interference Power measured from the same frequency at a different time.

Table 10.1.2-1: Received Interference Power relative accuracy

Parameter	Unit	Accuracy [dB]	Conditions
			Iob [dBm/180 kHz]
Iob	dBm/180 kHz	± 0.5	-117 ... -96 AND for changes ≤ ±9.0 dB

10.1.3 Received Interference Power measurement report mapping

The reporting range for *Received Interference Power (RIP)* is from -126 ... -75 dBm.

In table 10.2.3-1 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 10.1.3-1: Received Interference Power measurement reporting range

Reported value	Measured quantity value	Unit
RTWP_LEV _000	RIP < -126.0	dBm
RTWP_LEV _001	-126.0 ≤ RIP < -125.9	dBm
RTWP_LEV _002	-125.9 ≤ RIP < -125.8	dBm
…	…	…
RTWP_LEV _509	-75.2 ≤ RIP < -75.1	dBm
RTWP_LEV _510	-75.1 ≤ RIP < -75.0	dBm
RTWP_LEV _511	-75.0 ≤ RIP	dBm

Annex A (normative): Test Cases

A.1 Purpose of annex

This Annex specifies test specific parameters for some of the functional requirements in sections 4 to 9. The tests provide additional information to how the requirements should be interpreted for the purpose of conformance testing. The tests in this Annex are described such that one functional requirement may be tested in one or several test and one test may verify several requirements. Some requirements may lack a test.

The conformance tests are specified in TS 36.521-3 [23]. Statistical interpretation of the requirements is described in Annex A.2.

A.2 Requirement classification for statistical testing

Requirements in this specification are either expressed as absolute requirements with a single value stating the requirement, or expressed as a success rate. There are no provisions for the statistical variations that will occur when the parameter is tested.

Annex A outlines the tests in more detail and lists the test parameters needed. The test will result in an outcome of a test variable value for the device under test (DUT) inside or outside the test limit. Overall, the probability of a "good" DUT being inside the test limit(s) and the probability of a "bad" DUT being outside the test limit(s) should be as high as possible. For this reason, when selecting the test variable and the test limit(s), the statistical nature of the test is accounted for.

The statistical nature depends on the type of requirement. Some have large statistical variations, while others are not statistical in nature at all. When testing a parameter with a statistical nature, a confidence level is set. This establishes the probability that a DUT passing the test actually meets the requirements and determines how many times a test has to be repeated and what the pass and fail criteria are. Those aspects are not covered by TS 36.133. The details of the tests on how many times to run it and how to establish confidence in the tests are described in TS 36.521-3 [23]. This Annex establishes the variable to be used in the test and whether it can be viewed as statistical in nature or not.

A.2.1 Types of requirements in TS 36.133

A.2.1.1 Time and delay requirements on UE higher layer actions

A very large part of the RRM requirements are delay requirements:

- In E-UTRAN RRC_IDLE state mobility (clause A.4) there is cell re-selection delay.
- In E-UTRAN RRC_CONNECTED state mobility (clauses A.5 and A.8) there is handover delay, cell search delay and measurement reporting delay.
- In RRC Connection Control (clause A.6) there is RRC re-establishment delay.

All have in common that the UE is required to perform an action observable in higher layers (e.g. camp on the correct cell) within a certain time after a specific event (e.g. when a new strong pilot or reference signal appears). The delay time is statistical in nature for several reasons, among others that several of the measurements are performed by the UE in a fading radio environment.

The variations make a strict limit unsuitable for a test. Instead there is a condition set for a correct action by the UE, e.g. that the UE shall camp on the correct cell within X seconds. Then the rate of correct events is observed during repeated tests and a limit is set on the rate of correct events, usually 90% correct events are required. How the limit is applied in the test depends on the confidence required, further detailed are in TS 36.521-3 [23].

A.2.1.2 Measurements of power levels, relative powers and time

A very large number of requirements are on measurements that the UE performs:

- In E-UTRAN RRC_CONNECTED state mobility (clause A.5) there are measurement reports.
- In Measurement Performance Requirements (clause A.9) there are requirements for all type of measurements.

The accuracy requirements on measurements are expressed in this specification as a fixed limit (e.g. +/-X dB), but the measurement error will have a distribution that is not easily confined in fixed limits. Assuming a Gaussian distribution of the error, the limits will have to be set at +/-3.29σ if the probability of failing a "good DUT" in a single test is to be kept at 0.1%. It is more reasonable to set the limit tighter and test the DUT by counting the rate of measurements that are within the limits, in a way similar to the requirements on delay.

A.2.1.3 Implementation requirements

A few requirements are strict actions the UE should take or capabilities the UE should have, without any allowance for deviations. These requirements are absolute and should be tested as such. Examples are:

- "Event triggered report rate" in E-UTRAN RRC_CONNECTED state mobility (clauses A.5 and A.8)
- "Correct behaviour at time-out" in RRC connection control (clause A.6)

A.2.1.4 Physical layer timing requirements

There are requirements on Timing and Signaling Characteristics (clauses A.7). There are both absolute and relative limits on timing accuracy depending upon the type of requirement. Examples are:

- Initial Transmit Timing (clause A.7.1) has an absolute limit on timing accuracy.
- Timing Advance (clause A.7.2) has a relative limit on timing accuracy.

A.3 RRM test configurations

A.3.1 Reference Measurement Channels

A.3.1.1 PDSCH

A.3.1.1.1 FDD

Table A.3.1.1.1-1: PDSCH Reference Measurement Channels for FDD

Parameter	Unit	Value					
Reference channel		R.2 FDD			R.0 FDD	R.1 FDD	
Channel bandwidth	MHz	1.4	3	5	10	10	20
Number of transmitter antennas		1			1	2	
Allocated resource blocks (Note 4)		2			24	24	
Allocated subframes per Radio Frame		10			10	10	
Modulation		QPSK			QPSK	QPSK	
Target Coding Rate		1/3			1/3	1/3	
Information Bit Payload							
For Sub-Frames 4, 9	Bits	120			2088	2088	
For Sub-Frame 5	Bits	104			2088	1736	
For Sub-Frame 0	Bits	32			1736	1736	
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0			0	0	
Number of Code Blocks per Sub-Frame (Note 5)		1			1	1	
For Sub-Frames 4, 9		1			1	1	
For Sub-Frame 5		1			1	1	
For Sub-Frame 0		1			1	1	
For Sub-Frame 1, 2, 3, 6, 7, 8		0			0	0	
Binary Channel Bits Per Sub-Frame							
For Sub-Frames 4, 9	Bits	456			6624	6336	
For Sub-Frame 5	Bits	360			6336	6048	
For Sub-Frame 0	Bits	176			5784	5520	
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0			0	0	
Max. Throughput averaged over 1 frame	kbps	37.6			800	765	

Note 1: 2 symbols allocated to PDCCH for 10 MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW.
Note 2: Reference signal, synchronization signals and PBCH allocated as defined in 3GPP TS 36.211 [16].
Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in 3GPP TS 36.213 [3].
Note 4: Allocation is located in the middle of bandwidth.
Note 5: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)

A.3.1.1.2 TDD

Table A.3.1.1.2-1: PDSCH Reference Measurement Channels for TDD

Parameter	Unit	Value					
Reference channel		R.2 TDD			R.0 TDD	R.1 TDD	
Channel bandwidth	MHz	1.4	3	5	10	10	20
Number of transmitter antennas		1			1	2	
Allocated resource blocks (Note 4)		2			24	24	
Uplink-Downlink Configuration (Note 5)		1			1		
Special Subframe Configuration (Note 6)		6			6		
Allocated subframes per Radio Frame		6			6	6	
Modulation		QPSK			QPSK	QPSK	
Target Coding Rate		1/3			1/3	1/3	
Information Bit Payload							
For Sub-Frames 4,9	Bits	120			2088	2088	
For Sub-Frame 5	Bits	104			2088	2088	
For Sub-Frame 0	Bits	56			2088	1736	
For Sub-Frame 1, 6 (DwPTS)	Bits	56			1032	1032	
Number of Code Blocks per Sub-Frame (Note 7)							
For Sub-Frames 4,9		1			1	1	
For Sub-Frame 5		1			1	1	
For Sub-Frame 0		1			1	1	
For Sub-Frame 1, 6 (DwPTS)		1			1	1	
Binary Channel Bits Per Sub-Frame							
For Sub-Frames 4,9	Bits	456			6624	6336	
For Sub-Frame 5	Bits	408			6480	6192	
For Sub-Frame 0	Bits	224			5928	5664	
For Sub-Frame 1, 6 (DwPTS)	Bits	272			3696	3504	
Max. Throughput averaged over 1 frame	Mbps	0.0512			1.0416	1.0064	

Note 1: 2 symbols allocated to PDCCH for 10 MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW. For special subframe (1 & 6) only 2 OFDM symbols are allocated to PDCCH for all bandwidths.
Note 2: Reference signal, synchronization signals and PBCH allocated as defined in 3GPP TS 36.211 [16].
Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in 3GPP TS 36.213 [3].
Note 4: Allocation is located in the middle of bandwidth.
Note 5: As per Table 4.2-2 in TS 36.211 [16]
Note 6: As per Table 4.2-1 in TS 36.211 [16]
Note 7: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)

A.3.1.2 PCFICH/PDCCH/PHICH

A.3.1.2.1 FDD

Table A.3.1.2.1-1: PCFICH/PDCCH/PHICH Reference Channel for FDD

Parameter	Unit	Value					
Reference channel		R.8 FDD			R.6 FDD	R.7 FDD	
Channel bandwidth	MHz	1.4			10	10	
Number of transmitter antennas		1			1	2	
Control region OFDM symbols[Note1]	symbols	4			2	2	
Aggregation level	CCE	2 (Note 6)			8	8	
DCI Format		Note 3			Note 3	Note 3	
Cell ID		Note 4			Note 4	Note 4	
Payload (without CRC)	Bits	Note 5			Note 5	Note 5	
Note 1: The control region consists of PCFICH, PHICH and PDCCH. Note 2: DCI formats are defined in 3GPP TS 36.212. Note 3: DCI format shall depend upon the test configuration. Note 4: Cell ID shall depend upon the test configuration. Note 5: Payload size shall depend upon the test configuration. Note 6: For PDCCH using SI/RA/P-RNTI, Aggregation level 4 is used.							

A.3.1.2.2 TDD

Table A.3.1.2.2-1: PCFICH/PDCCH/PHICH Reference Channel for TDD

Parameter	Unit	Value					
Reference channel		R.8 TDD			R.6 TDD	R.7 TDD	
Channel bandwidth	MHz	1.4			10	10	
Number of transmitter antennas		1			1	2	
Control region OFDM symbols[Note1]	symbols	4 (Note 6)			2	2	
Aggregation level	CCE	2 (Note 7)			8	8	
DCI Format		Note 3			Note 3	Note 3	
Cell ID		Note 4			Note 4	Note 4	
Payload (without CRC)	Bits	Note 5			Note 5	Note 5	
Note 1: The control region consists of PCFICH, PHICH and PDCCH. Note 2: DCI formats are defined in 3GPP TS 36.212. Note 3: DCI format shall depend upon the test configuration. Note 4: Cell ID shall depend upon the test configuration. Note 5: Payload size shall depend upon the test configuration. Note 6: Only 2 OFDM symbols for special subframes 1 and 6. Note 7: For PDCCH using SI/RA/P-RNTI, Aggregation level 4 is used.							

A.3.2 OFDMA Channel Noise Generator (OCNG)

A.3.2.1 OCNG Patterns for FDD

The following OCNG patterns are used for modelling allocations to virtual UEs (which are not under test) and/or allocations used for MBSFN. The OCNG pattern for each sub frame specifies the allocations that shall be filled with OCNG, and furthermore, the relative power level of each such allocation.

In each test case the OCNG is expressed by parameters OCNG_RA and OCNG_RB which together with a relative power level (γ) specifies the PDSCH EPRE-to-RS EPRE ratios in OFDM symbols without and with reference symbols, respectively. The relative power, which is used for modelling boosting per virtual UE allocation, is expressed by:

$$\gamma_i = PDSCH_i\_RA / OCNG\_RA = PDSCH_i\_RB / OCNG\_RB,$$

where γ_i denotes the relative power level of the i:th virtual UE. The parameter settings of OCNG_RA, OCNG_RB, and the set of relative power levels γ are chosen such that when also taking allocations to the UE under test into account, as given by a PDSCH reference channel, a constant transmitted power spectral density that is constant on an OFDM symbol basis is targeted.

Moreover the OCNG pattern is accompanied by a PCFICH/PDCCH/PHICH reference channel which specifies the control region. For any aggregation and PHICH allocation, the PDCCH is padded with resource element groups with a power level given by PDCCH_RA and PDCCH_RB as specified in the test case such that a total power spectral density in the control region that is constant on an OFDM symbol basis is targeted.

A.3.2.1.1 OCNG FDD pattern 1: outer resource blocks allocation in 10 MHz

Table A.3.2.1.1-1: OP.1 FDD: OCNG FDD Pattern 1

Allocation n_{PRB}	**Relative power level γ_{PRB} [dB]**				**PDSCH Data**	**PMCH Data**
	Subframe					
	0	5	4,9	1-3, 6-8		

0 – 12	0	0	0	N/A	Note 1	N/A
37 – 49	0	0	0	N/A		
0-49	N/A	N/A	N/A	Note 4	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH symbols shall not contain cell-specific Reference Signals. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

A.3.2.1.2 OCNG FDD pattern 2: full bandwidth allocation in 10 MHz

Table A.3.2.1.2-1: OP.2 FDD: OCNG FDD Pattern 2

Allocation n_{PRB}	Relative power level γ_{PRB} [dB] Subframe				PDSCH Data	PMCH Data
	0	5	4, 9	1 – 3, 6 – 8		
0 – 49	0	0	0	N/A	Note 1	N/A
0 – 49	N/A	N/A	N/A	Note 4	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

A.3.2.1.3 OCNG FDD pattern 3: outer resource blocks allocation in 1.4 MHz

Table A.3.2.1.3-1: OP.3 FDD: OCNG FDD Pattern 3

Allocation n_{PRB}		**Relative power level** γ_{PRB} **[dB]**											**PDSCH Data**	**PMCH Data**
		Subframe												
		0			5			4,9			1-3, 6-8			
		Control region OFDM symbols[Note 2]												
		1	2	3	1	2	3	1	2	3	1	2		
0 – 1	N	0			0			0			N/A		Note 1	N/A
4 – 5	N	0			0			0			N/A			
0 – 5	N	N/A			N/A			N/A			Note 4		N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH symbols shall not contain cell-specific Reference Signals. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N: Normal
N/A: Not Applicable

A.3.2.1.4 OCNG FDD pattern 4: full bandwidth allocation in 1.4 MHz

Table A.3.2.1.4-1: OP.4 FDD: OCNG FDD Pattern 4

Allocation n_{PRB}	**Relative power level γ_{PRB} [dB]**				**PDSCH Data**	**PMCH Data**
	Subframe					
	0	5	4, 9	1 – 3, 6 – 8		
0 – 5	0	0	0	N/A	Note 1	N/A
0 – 5	N/A	N/A	N/A	Note 4	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated.The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

A.3.2.2 OCNG Patterns for TDD

The following OCNG patterns are used for modelling allocations to virtual UEs (which are not under test). The OCNG pattern for each sub frame specifies the allocations that shall be filled with OCNG, and furthermore, the relative power level of each such allocation.

In each test case the OCNG is expressed by parameters OCNG_RA and OCNG_RB which together with a relative power level (γ) specifies the PDSCH EPRE-to-RS EPRE ratios in OFDM symbols without and with reference symbols, respectively. The relative power, which is used for modelling boosting per virtual UE allocation, is expressed by:

$$\gamma_i = PDSCH_i\_RA / OCNG\_RA = PDSCH_i\_RB / OCNG\_RB,$$

where γ_i denotes the relative power level of the i:th virtual UE. The parameter settings of OCNG_RA, OCNG_RB, and the set of relative power levels γ are chosen such that when also taking allocations to the UE under test into account, as given by a PDSCH reference channel, a transmitted power spectral density that is constant on an OFDM symbol basis is targeted.

Moreover the OCNG pattern is accompanied by a PCFICH/PDCCH/PHICH reference channel which specifies the control region. For any aggregation and PHICH allocation, the PDCCH is padded with resource element groups with a power level given by PDCCH_RA and PDCCH_RB as specified in the test case such that a total power spectral density in the control region that is constant on an OFDM symbol basis is targeted.

A.3.2.2.1 OCNG TDD pattern 1: outer resource blocks allocation in 10 MHz

Table A.3.2.2.1-1: OP.1 TDD: OCNG TDD Pattern 1 for 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data
	Subframe				
	0	5	3 , 4, 8, 9 Note 2	1, 6	
0 – 12	0	0	0	0	Note 1
37 – 49	0	0	0	0	

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in 3GPP TS 36.211 [16].

Note 3: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Table A.3.2.2.1-2: OP.1 TDD: OCNG TDD Pattern 1 for special subframe configuration with 5ms downlink-to-uplink switch-point periodicity

<table>
<tr><th rowspan="4">Allocation
n_{PRB}</th><th rowspan="4">CP length</th><th colspan="18">Relative power level γ_{PRB} [dB]</th></tr>
<tr><th colspan="18">Special subframe configuration</th></tr>
<tr><td colspan="2">0</td><td colspan="2">1</td><td colspan="2">2</td><td colspan="2">3</td><td colspan="2">4</td><td colspan="2">5</td><td colspan="2">6</td><td colspan="2">7</td><td colspan="2">8</td></tr>
<tr><th colspan="18">Control region OFDM symbols</th></tr>
<tr><td></td><td></td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td></tr>
<tr><td>0 – 12</td><td>N</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td></tr>
<tr><td>37 – 49</td><td>N</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td></tr>
<tr><td colspan="20">Note 1: Special subframe configurations are defined in Table 4.2-1 in TS 36.211 [16].</td></tr>
</table>

A.3.2.2.2 OCNG TDD pattern 2: full bandwidth allocation in 10 MHz

Table A.3.2.2.2-1: OP.2 TDD: OCNG TDD Pattern 2 for 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data
	Subframe				
	0	5	3 , 4, 8, 9 Note 2	1, 6	
0 – 49	0	0	0	0	Note 1

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Subframes available for DL transmission depends on the Uplink-Downlink configuration in Table 4.2-2 in 3GPP TS 36.211 [16].

Note 3: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

A.3.2.2.3 OCNG TDD pattern 3: outer resource blocks allocation in 1.4 MHz

Table A.3.2.2.3-1: OP.3 TDD: OCNG TDD Pattern 3 for 5 ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data
	Subframe				
	0	5	3, 4, 8, 9 Note 2	1, 6	
0 – 1	0	0	0	0	Note 1
4 – 5	0	0	0	0	

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated.The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in 3GPP TS 36.211 [16].

Note 3: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Table A.3.2.2.3-2: OP.1 TDD: OCNG TDD Pattern 1 for special subframe configuration with 5 ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	CP length	Relative power level γ_{PRB} [dB]																	
		Special subframe configuration																	
		0		1		2		3		4		5		6		7		8	
		Control region OFDM symbols																	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0 – 1	N	0		0		0		0		0		0		0		0		0	
4 – 5	N	0		0		0		0		0		0		0		0		0	

Note 1: Special subframe configurations are defined in Table 4.2-1 in TS 36.211 [16].

A.3.2.2.4 OCNG TDD pattern 4: full bandwidth allocation in 1.4 MHz

Table A.3.2.2.4-1: OP.4 TDD: OCNG TDD Pattern 4 for 5 ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data
	Subframe				
	0	5	3, 4, 8, 9 Note 2	1, 6	

0 – 5	0	0	0	0	Note 1
Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated.The parameter γ_{PRB} is used to scale the power of PDSCH. Note 2: Subframes available for DL transmission depends on the Uplink-Downlink configuration in Table 4.2-2 in 3GPP TS 36.211 [16]. Note 3: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.					

A.3.3 Reference DRX Configurations

Table A.3.3-1: Reference DRX Configurations

Parameter	Value		Comments
Reference configuration	DRX_S	DRX_L	As defined in 4.8.2.1.5 in TS 36.508
onDurationTimer	psf2	psf6	
drx-InactivityTimer	psf100	psf1920	
drx-RetransmissionTimer	sf16	sf16	
longDRX-CycleStartOffset	sf40, 0	sf1280, 0	
shortDRX	disabled	disabled	
Note: For further information see section 6.3.2 in 3GPP TS 36.331.			

A.4 E-UTRAN RRC_IDLE state

A.4.2 Cell Re-Selection

A.4.2.1 E-UTRAN FDD – FDD Intra frequency case

A.4.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD intra frequency cell reselection requirements specified in section 4.2.2.3.

The test scenario comprises of 1 E-UTRA FDD carrier and 2 cells as given in tables A.4.2.1.1-1 and A.4.2.1.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Only Cell 1 is already identified by the UE prior to the start of the test, i.e. Cell 2 is not identified by the UE prior to the start of the test. Cell 1 and Cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2.

Table A.4.2.1.1-1: General test parameters for FDD intra frequency cell reselection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2	
T2 end condition	Active cell		Cell2	
	Neighbour cells		Cell1	
Final condition	Visited cell		Cell1	
E-UTRA RF Channel Number			1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Time offset between cells			3 ms	Asynchronous cells
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration			4	As specified in table 5.7.1-2 in 3GPP TS 36.211
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	>7	During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2
T2		s	40	T2 need to be defined so that cell re-selection reaction time is taken into account.
T3		s	15	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.1.1-2: Cell specific test parameters for FDD intra frequency cell reselection test case in AWGN

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1. 2 (OP.2 FDD)		OP.2 FDD			OP.2 FDD		
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0			0		
Qrxlevmin	dBm	-140	-140	-140	-140	-140	-140
Pcompensation	dB	0	0	0	0	0	0
$Qhyst_s$	dB	0	0	0	0	0	0
$Qoffset_{s,\ n}$	dB	0	0	0	0	0	0
Cell_selection_and_ reselection_quality_ measurement		RSRP			RSRP		
$\hat{E}_s/I_{ot}$	dB	16	-3.11	2.79	-infinity	2.79	-3.11
N_{oc} Note2	dBm/15 kHz	-98					
$\hat{E}_s/N_{oc}$	dB	16	13	16	-infinity	16	13
RSRP Note3	dBm/15 kHz	-82	-85	-82	-infinity	-82	-85
Treselection	s	0	0	0	0	0	0
Sintrasearch	dB	Not sent			Not sent		
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.4.2.1.2 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than 34 s.

The cell reselection delay to an already detected cell is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 1.

The cell re-selection delay to an already detected cell shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as: $T_{detect,EUTRAN\_Intra} + T_{SI}$, and to an already detected cell can be expressed as: $T_{evaluateFDD,intra} + T_{SI}$,

Where:

$T_{detect,EUTRAN\_Intra}$ See Table 4.2.2.3-1 in section 4.2.2.3

$T_{evaluateFDD,intra}$ See Table 4.2.2.3-1 in section 4.2.2.3

T_{SI} Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 33.28 s, allow 34 s for the cell re-selection delay to a newly detectable cell and 7.68 s, allow 8 s for the cell re-selection delay to an already detected cell in the test case.

A.4.2.2 E-UTRAN TDD – TDD Intra frequency case

A.4.2.2.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD intra frequency cell reselection requirements specified in section 4.2.2.3.

The test scenario comprises of 1 E-UTRA TDD carrier and 2 cells as given in tables A.4.2.2.1-1 and A.4.2.2.1-2. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.2.1-1: General test parameters for TDD intra frequency cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2	
T2 end condition	Active cell		Cell2	
	Neighbour cells		Cell1	
Final condition	Visited cell		Cell1	
E-UTRA RF Channel Number			1	Only one TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Time offset between cells		µs	3	Synchronous cells
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in 3GPP TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in 3GPP TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in 3GPP TS 36.211
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	>7	During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2
T2		s	40	T2 need to be defined so that cell re-selection reaction time is taken into account.
T3		s	15	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.2.1-2: Cell specific test parameters for TDD intra frequency cell re-selection test case in AWGN

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Pattern defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD			OP.2 TDD		
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0			0		
Qrxlevmin	dBm	-140			-140		
Pcompensation	dB	0			0		
$Qhyst_s$	dB	0			0		
$Qoffset_{s,n}$	dB	0			0		
Cell_selection_and_reselection_quality_measurement		RSRP			RSRP		
$\hat{E}_s/I_{ot}$	dB	16	-3.11	2.79	-infinity	2.79	-3.11
N_{oc} Note2	dBm/15 kHz	-98					
$\hat{E}_s/N_{oc}$	dB	16	13	16	-infinity	16	13
RSRP Note3	dBm/15 kHz	-82	-85	-82	-infinity	-82	-85
Treselection	s	0	0	0	0	0	0
Sintrasearch	dB	Not sent			Not sent		
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.4.2.2.2 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than 34 s.

The cell reselection delay to an already detected cell is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as: $T_{detect,EUTRAN\_Intra}$ + $T_{SI-EUTRA}$, and to an already detected cell can be expressed as: $T_{evaluate,\ E-UTRAN\_\ intra}$ + $T_{SI-EUTRA}$,

Where:

$T_{detect,EUTRAN\_Intra}$ See Table 4.2.2.3-1 in section 4.2.2.3

$T_{evaluate,E-UTRAN\_\ intra}$ See Table 4.2.2.3-1 in section 4.2.2.3

$T_{SI-EUTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 33.28 s, allow 34 s for the cell re-selection delay to a newly detectable cell and 7.68 s, allow 8 s for the cell re-selection delay to an already detected cell in the test case.

A.4.2.3 E-UTRAN FDD – FDD Inter frequency case

A.4.2.3.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD inter-frequency cell reselection requirements specified in section 4.2.2.4.

The test scenario comprises of 2 E-UTRA FDD cells on 2 different carriers as given in tables A.4.2.3.1-1 and A.4.2.3.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.3.1-1: General test parameters for FDD-FDD inter frequency cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation phase, so that reselection to cell 1 occurs during the first T1 phase
T1 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T1
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
E-UTRA RF Channel Number			1, 2	Two FDD carrier frequencies are used.
Time offset between cells			3 ms	Asynchronous cells
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
T3		s	75	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.3.1-2: Cell specific test parameters for FDD-FDD inter-frequency cell reselection test case in AWGN

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.2 FDD)		OP.2 FDD			OP.2 FDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
Qrxlevmin	dBm	-140			-140		
N_{oc} Note 2	dBm/15 kHz	-98					
RSRP Note 3	dBm/15 KHz	-84	-84	-84	-102	-infinity	-86
$\hat{E}_s/I_{ot}$	dB	14	14	14	-4	-infinity	12
$\hat{E}_s/N_{oc}$	dB	14	14	14	-4	-infinity	12
$Treselection_{EUTRAN}$	s	0			0		
Snonintrasearch	dB	50			Not sent		
$Thresh_{x, high}$	dB	48			48		
$Thresh_{serving, low}$	dB	44			44		
$Thresh_{x, low}$	dB	50			50		
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.4.2.3.2 Test Requirements

The cell reselection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to higher priority shall be less than 68 s.

The cell reselection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to lower priority shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as: $T_{higher\_priority\_search} + T_{evaluateFDD,inter} + T_{SI}$, and to lower priority cell can be expressed as: $T_{evaluateFDD,inter} + T_{SI}$, Where:

$T_{higher\_priority\_search}$	See section 4.2.2
$T_{evaluateFDD,inter}$	See Table 4.2.2.4-1 in section 4.2.2.4
T_{SI}	Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s for higher priority cell search and 7.68 s for lower priority cell search, allow 68 s for higher priority cell and 8 s for lower priority cell in the test case.

A.4.2.4 E-UTRAN FDD – TDD Inter frequency case

A.4.2.5 E-UTRAN TDD – FDD Inter frequency case

A.4.2.6 E-UTRAN TDD – TDD: Inter frequency case

A.4.2.6.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD inter-frequency cell reselection requirements specified in section 4.2.2.4.

The test scenario comprises of 2 E-UTRA TDD cells on 2 different carriers as given in tables A.4.2.6.1-1 and A.4.2.6.1-2. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.6.1-1: General test parameters for TDD-TDD inter frequency cell reselection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation phase, so that reselection to cell 1 occurs during the first T1 phase
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
E-UTRA RF Channel Number			1, 2	Two TDD carrier frequencies are used.
Time offset between cells			3 µs	Synchronous cells
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in 3GPP TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in 3GPP TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in 3GPP TS 36.211
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
T3		s	75	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.6.1-2: Cell specific test parameters for TDD-TDD inter-frequency cell reselection test case in AWGN

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Pattern defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD			OP.2 TDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note 1]	dB						
OCNG_RB[Note 1]	dB						

Qrxlevmin	dBm	-140			-140		
N_{oc} Note 2	dBm/15 kHz	-98					
RSRP Note 3	dBm/15 KHz	-84	-84	-84	-102	-infinity	-86
$\hat{E}_s/I_{ot}$	dB	14	14	14	-4	-infinity	12
$\hat{E}_s/N_{oc}$	dB	14	14	14	-4	-infinity	12
$Treselection_{EUTRAN}$	S	0			0		
Snonintrasearch	dB	50			Not sent		
$Thresh_{x, high}$	dB	48			48		
$Thresh_{serving, low}$	dB	44			44		
$Thresh_{x, low}$	dB	50			50		
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.4.2.6.2 Test Requirements

The cell reselection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to higher priority shall be less than 68 s.

The cell reselection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to lower priority shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as: $T_{higher\_priority\_search}$ + $T_{evaluate,E-UTRAN\_inter}$ + $T_{SI-EUTRA}$, and to lower priority cell can be expressed as: $T_{evaluate,E-UTRAN\_inter}$ + $T_{SI-EUTRA}$,

Where:

$T_{higher\_priority\_search}$ See section 4.2.2

$T_{evaluate,E-UTRAN\_inter}$ See Table 4.2.2.4-1 in section 4.2.2.4

$T_{SI-EUTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s for higher priority cell search and 7.68 s for lower priority cell search, allow 68 s for higher priority cell and 8 s for lower priority cell in the test case.

A.4.3 E-UTRAN to UTRAN Cell Re-Selection

A.4.3.1 E-UTRAN FDD – UTRAN FDD:

A.4.3.1.1 EUTRA FDD-UTRA FDD cell reselection: UTRA FDD is of higher priority

A.4.3.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRA FDD- UTRA FDD inter-RAT cell reselection requirements specified in section 4.2.2.5 when the UTRA cell is of higher priority.

The test scenario comprises of one E-UTRA FDD and one UTRA FDD cells as given in tables A.4.3.1.1.1-1, A.4.3.1.1.1-2 and A.4.3.1.1.1-3. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. E-UTRA cell 1 is already identified by the UE prior to the start of the test. Cell 2 is of higher priority than cell 1.

Table A.4.3.1.1.1-1: General test parameters for E-UTRA FDD- higher priority UTRA FDD inter RAT cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	UE is on cell 1 in the initialisation phase, so that reselection to cell 2 occurs during T2
T2 end condition	Active cell		Cell 2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell 1	
T3 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T3
	Neighbour cell		Cell 2	
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E_UTRA Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	>20	During T1, cell 2 shall be powered off, and during the off time the primary scrambling code shall be changed. The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2		s	85	T2 needs to be defined so that cell re-selection reaction time is taken into account.
T3		s	25	T3 needs to be defined so that cell re-selection reaction time is taken into account.

Table A.4.3.1.1.1-2: Cell specific test parameters for cell 1(E-UTRA)

Parameter	Unit	Cell 1		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD		
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA[Note 1]	dB			
OCNG_RB[Note 1]	dB			
Qqualmin for UTRA neighbour cell	dB	-20		
Qrxlevmin for UTRA neighbour cell	dBm	-115		
Qrxlevmin	dBm	-140		
N_{oc}	dBm/15 kHz	-98		
RSRP	dBm/15 KHz	-84	-84	-84
$\hat{E}_s/I_{ot}$	dB	14	14	14
$\hat{E}_s/N_{oc}$	dB	14	14	14
$Treselection_{EUTRAN}$	S	0		
Snonintrasearch	dB	50		
$Thresh_{x, high}$ (Note 2)	dB	40		
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2 : This refers to the value of $Thresh_{x, high}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell				

Table A.4.3.1.1.1-3: Cell specific test parameters for cell 2(UTRA)

Parameter	Unit	Cell 2 (UTRA)		
		T1	T2	T3
UTRA RF Channel Number		Channel 2		
CPICH_Ec/Ior	dB	-10		
PCCPCH_Ec/Ior	dB	-12		
SCH_Ec/Ior	dB	-12		
PICH_Ec/Ior	dB	-15		
OCNS_Ec/Ior	dB	-0.941		
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	11	-5
I_{oc}	dBm/3,84 MHz	-70		
CPICH_Ec/Io	dB	-Infinity	-10.33	-16.19
CPICH_RSCP	dBm	-Infinity	-69	-85
Propagation Condition		AWGN		
Qqualmin	dB	-20		
Qrxlevmin	dBm	-115		
QrxlevminEUTRA	dBm	-140		

UE_TXPWR_MAX_RACH	dBm	21
Treselection	s	0
Sprioritysearch1	dB	62
Sprioritysearch2	dB	0
$Thresh_{serving, low}$	dB	36
$Thresh_{x, low}$ (Note 1)	dB	50
Note 1 : This refers to the value of $Thresh_{x, low}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell		

A.4.3.1.1.2 Test Requirements

The cell reselection delay to higher priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to higher priority shall be less than 81 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as: $T_{higher\_priority\_search} + T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$

Where:

$T_{higher\_priority\_search}$ See section 4.2.2; 60s is assumed in this test case

$T_{evaluateUTRA-FDD}$ See Table 4.2.2.5.1-1

$T_{SI-UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 80.48 s for higher priority cell search, allow 81 s for higher priority cell reselection in the test case.

A.4.3.1.2 EUTRA FDD-UTRA FDD cell reselection: UTRA FDD is of lower priority

A.4.3.1.2.1 Test Purpose and Environment

This test is to verify the requirement for the EUTRA FDD- UTRA FDD inter-RAT cell reselection requirements specified in section 4.2.2.5.1 when the UTRA cell is of lower priority.

The test scenario comprises of one UTRA FDD and one E-UTRA FDD cells as given in tables A.4.3.1.2.1-1, A.4.3.1.2.1-2 and A.4.3.1.2.1-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both E-UTRA cell 1 and UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1.

Table A.4.3.1.2.1-1: General test parameters for EUTRA FDD- lower priority UTRA FDD inter RAT cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T for subsequent iterations of the test 1
	Neighbour cell		Cell2	
T2 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell1	
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E_UTRA Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	85	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	25	T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.3.1.2.1-2: Cell specific test parameters for cell 1 (E-UTRA)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		

Qqualmin for UTRA neighbour cell	dB	-20	
Qrxlevmin for UTRA neighbour cell	dBm	-115	
Qrxlevmin	dBm	-140	
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-86	-102
$\hat{E}_s/I_{ot}$	dB	12	-4
$\hat{E}_s/N_{oc}$	dB	12	-4
$Treselection_{EUTRAN}$	s	0	
Snonintrasearch	dB	Not sent	
$Thresh_{serving, low}$	dB	44	
$Thresh_{x, low}$ (Note 2)	dB	42	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2 : This refers to the value of $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell.			

Table A.4.3.1.2.1-3: Cell specific test parameters for cell 2 (UTRA)

Parameter	Unit	Cell 2 (UTRA)	
		T1	**T2**
UTRA RF Channel Number		Channel 2	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
OCNS_Ec/Ior	dB	-0.941	
$\hat{I}_{or}/I_{oc}$	dB	13	13
I_{oc}	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-10.21	-10.21
CPICH_RSCP	dBm	-67	-67
Propagation Condition		AWGN	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
QrxlevminEUTRA	dBm	-140	
UE_TXPWR_MAX_RACH	dBm	21	
Treselection	s	0	
Sprioritysearch1	dB	42	
Sprioritysearch2	dB	0	
$Thresh_{x, high}$ (Note 1)	dB	48	
Note 1 : This refers to the value of $Thresh_{x, high}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell			

A.4.3.1.2.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$

Where:

$T_{evaluateUTRA-FDD}$ See Table 4.2.2.5.1-1

$T_{SI-UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

A.4.3.1.3 EUTRA FDD-UTRA FDD cell reselection in fading propagation conditions: UTRA FDD is of lower priority

A.4.3.1.3.1 Test Purpose and Environment

This test is to verify the requirement for the EUTRA FDD- UTRA FDD inter-RAT cell reselection requirements specified in section 4.2.2.5.1 when the UTRA cell is of lower priority, and to verify the robustness of the UE measurement filtering in a fading environment. The E-UTRA cell is in fading propagation conditions and the UTRA cell is in AWGN propagation conditions.

The test scenario comprises of one UTRA FDD and one E-UTRA FDD cells as given in tables A.4.3.1.3.1-1, A.4.3.1.3.1-2 and A.4.3.1.3.1-3. The test consists of four successive time periods, with time duration of T1 T2, T3 and T4 respectively. Both E-UTRA cell 1 and UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1.

Table A.4.3.1.3.1-1: General test parameters for EUTRA FDD- lower priority UTRA FDD inter RAT cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	
T3 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
	Neighbour cell		Cell1	
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E_UTRA Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	<85	T1 need to be defined so that cell re-selection reaction time is taken into account. T1 is terminated when the UE starts to send preambles to cell 1
T2		s	64	The start of T2 is defined as the time when the UE starts to send PRACH preambles to cell 1
T3		s	<25	T3 need to be defined so that cell re-selection reaction time is taken into account. T3 is terminated when the UE starts to send preambles to cell 2
T4		s	64	The start of T4 is defined as the time when the UE starts to send PRACH preambles to cell 2

Table A.4.3.1.3.1-2: Cell specific test parameters for cell 1 (E-UTRA)

Parameter	Unit	Cell 1			
		T1	T2	T3	T4
E-UTRA RF Channel number		1			
$BW_{channel}$	MHz	10			
OCNG Patterns defined in A.3		OP.2 FDD			
PSS_RA	dB	0			
SSS_RA	dB	0			
PCFICH_RB	dB	0			
PHICH_RA	dB	0			
PHICH_RB	dB	0			
PDCCH_RA	dB	0			
PDCCH_RB	dB	0			
PDSCH_RA	dB	0			
PDSCH_RB	dB	0			
OCNG_RA[Note 1]	dB	0			
OCNG_RB[Note 1]	dB	0			
Qqualmin for UTRA neighbour	dB	-20			
Qrxlevmin for UTRA neighbou	dBm	-115			
Qrxlevmin	dBm	-140			
N_{oc}	dBm/15 kHz	-104			
RSRP	dBm/15 KHz	-82	-82	-107	-107
$\hat{E}_s/I_{ot}$	dB	22	22	-3	-3
$\hat{E}_s/N_{oc}$	dB	22	22	-3	-3
$Treselection_{EUTRAN}$	s	0			
Snonintrasearch	dB	Not sent			
$Thresh_{serving, low}$	dB	44			
$Thresh_{x, low}$ (Note 2)	dB	42			
Propagation Condition		ETU70			

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total t spectral density is achieved for all OFDM symbols.
Note 2 :	This refers to the value of Thresh$_{x, low}$ which is included in E-UTRA system inform threshold for the UTRA target cell.

Table A.4.3.1.3.1-3: Cell specific test parameters for cell 2 (UTRA)

Parameter	Unit	Cell 2 (UTRA)			
		T1	T2	T3	T4
UTRA RF Channel Number		Channel 2			
CPICH_Ec/Ior	dB	-10			
PCCPCH_Ec/Ior	dB	-12			
SCH_Ec/Ior	dB	-12			
PICH_Ec/Ior	dB	-15			
OCNS_Ec/Ior	dB	-0.941			
$\hat{I}_{or}/I_{oc}$	dB	13	13	13	13
I_{oc}	dBm/3,84 MHz	-70			
CPICH_Ec/Io	dB	-10.21	-10.21	-10.21	-10.21
CPICH_RSCP	dBm	-67	-67	-67	-67
Propagation Condition		AWGN			
Qqualmin	dB	-20			
Qrxlevmin	dBm	-115			
QrxlevminEUTRA	dBm	-140			
UE_TXPWR_MAX_RACH	dBm	21			
Treselection	s	0			
Sprioritysearch1	dB	42			
Sprioritysearch2	dB	0			
Thresh$_{x, high}$ (Note 1)	dB	44			
Note 1 : This refers to the value of Thresh$_{x, high}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell					

A.4.3.1.3.2 Test Requirements

The probability of reselection from cell 1to cell 2 during T2 observed during testing shall be less than 10%

The probability of reselection from cell 2 to cell 1 during T4 observed during testing shall be less than 10%

The cell reselection delay to lower priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2. In order to evaluate reselection delay, the system simulator first needs to verify that the UE is camped on cell 1 at the start of T3

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$

Where:

$T_{evaluateUTRA-FDD}$ See Table 4.2.2.5.1-1

$T_{SI-UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

A.4.3.2 E-UTRAN FDD – UTRAN TDD:

A.4.3.2.1 Test Purpose and Environment

A.4.3.2.1.1 3.84Mcps TDD option

A.4.3.2.1.2 1.28Mcps TDD option

This test is to verify the requirement for the E-UTRA FDD to UTRA TDD inter-RAT cell reselection requirements specified in section 4.2.2.5.2 when the UTRA cell is of lower priority.

This test scenario comprised of 1 E-UTRA FDD serving cell (Cell 1), and 1 UTRA TDD cell (Cell 2) to be re-selected. Test parameters are given in table A.4.3.2.1.2-1, A.4.3.2.1.2-2, and A.4.3.2.1.2-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Cell 2 is of lower priority than cell 1.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS36.304.

Table A.4.3.2.1.2-1: General test parameters for E-UTRA FDD to UTRA (1.28 Mcps TDD OPTION) Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	1.28 Mcps TDD OPTION cell
T2 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell1	E-UTRA FDD cell
CP length of cell 1			normal	
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells			3 ms	Asynchronous cells
Access Barring Information		-	Not sent	No additional delays in random access procedure.
Treselection		s	0	
DRX cycle length		s	1,28	
HCS			Not used	
T1		s	85	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	25	

Table A.4.3.2.1.2-2: Cell specific test parameters for cell re-selection E-UTRA FDD to UTRA TDD test case (cell 1)

Parameter	Unit	Cell 1	
		T1	**T2**
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RB	dB		
SSS_RB	dB		
PCFICH_PA	dB		
PHICH_PA	dB		
PHICH_PB	dB		
PDCCH_PA	dB		
PDCCH_PB	dB		
PDSCH_PA	dB		
PDSCH_PB	dB		
OCNG_RA^Note1	dB		
OCNG_RB^Note1	dB		
Qrxlevmin	dBm/15kHz	-140	-140
N_{oc}	dBm/15kHz	-98	
RSRP	dBm/15kHz	-87	-101
$\hat{E}_s/I_{ot}$	dB	11	-3
$S_{nonintrasearch}$	dB	Not sent	
$Thresh_{serving, low}$	dB	46 (-94dBm)	
$Thresh_{x, low}$ (Note2)	dB	24 (-79dBm)	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note2: This refers to the value of Threshx, low which is included in E-UTRA system information, and is a threshold for the UTRA TDD target cell			

Table A.4.3.2.1.2-3: Cell specific test parameters for cell re-selection E-UTRA FDD to UTRA TDD test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number (Note1)		Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior	dB	-3	-3		
$\hat{I}_{or}/I_{oc}$	dB	11	11	11	11
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-72	-72	n.a.	n.a.
Propagation Condition		AWGN			
Qrxlevmin	dBm	-103			
Qoffset1$_{s,n}$	dB	C1, C2: 0			
Qhyst1$_{s}$	dB	0			
Thresh$_{x, high}$ (Note2)	dB	46 (-94dBm)			
Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note2: This refers to the value of Thresh$_{x, high}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell					

A.4.3.2.1.3 7.68Mcps TDD option

A.4.3.2.1 Test Requirements

A.4.3.2.1.1 3.84Mcps TDD option

A.4.3.2.1.2 1.28Mcps TDD option

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA\_TDD} + T_{SI-UTRA}$

Where:

$T_{evaluateUTRA\_TDD}$ 19.2s, See table table 4.2.2.5.2-1

$T_{SI-UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s, allow 21 s for lower priority cell reselection in the test case.

A.4.3.2.2.2.3 7.68Mcps TDD option

A.4.3.3 E-UTRAN TDD – UTRAN FDD:

A.4.3.3.1 Test Purpose and Environment

This test is to verify the requirement for the EUTRA TDD- UTRA FDD inter-RAT cell reselection requirements specified in section 4.2.2.5.1 when the UTRA cell is of lower priority.

The test scenario comprises of one UTRA FDD and one E-UTRA TDD cells as given in tables A.4.3.3.1-1, A.4.3.3.1-2 and A.4.3.3.1-3. The test consists of two successive time periods, with time duration of T1 andT2 respectively. Both E-UTRA cell 1 and UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1.

Table A.4.3.3.1-1: General test parameters for EUTRA TDD- lower priority UTRA FDD inter RAT cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	
T2 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell1	
E-UTRA PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
E_UTRA Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	85	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	25	T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.3.3.1-2: Cell specific test parameters for cell 1(E-UTRA)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		

Qqualmin for UTRA neighbour cell	dB	-20	
Qrxlevmin for UTRA neighbour cell	dBm	-115	
Qrxlevmin	dBm	-140	
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-86	-102
$\hat{E}_s/I_{ot}$	dB	12	-4
$\hat{E}_s/N_{oc}$	dB	12	-4
$Treselection_{EUTRAN}$	s	0	
Snonintrasearch	dB	Not sent	
$Thresh_{serving, low}$	dB	44	
$Thresh_{x, low}$ (Note 2)	dB	42	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2 : This refers to the value of $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell			

Table A.4.3.3.1-3: Cell specific test parameters for cell 2 (UTRA)

Parameter	Unit	Cell 2 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 2	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
OCNS_Ec/Ior	dB	-0.941	
$\hat{I}_{or}/I_{oc}$	dB	13	13
I_{oc}	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-10.21	-10.21
CPICH_RSCP	dBm	-67	-67
Propagation Condition		AWGN	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
QrxlevminEUTRA	dBm	-140	
UE_TXPWR_MAX_RACH	dBm	21	
Treselection	s	0	
Sprioritysearch1	dB	42	
Sprioritysearch2	dB	0	
$Thresh_{x, high}$ (Note 1)	dB	48	
Note 1 : This refers to the value of $Thresh_{x, high}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell			

A.4.3.3.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$

Where:

$T_{evaluateUTRA-FDD}$ See Table 4.2.2.5.1-1

$T_{SI-UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

A.4.3.4 E-UTRAN TDD – UTRAN TDD:

A.4.3.4.1 E-UTRA to UTRA TDD cell re-selection: UTRA is of higher priority

A.4.3.4.1.1 Test Purpose and Environment

A.4.3.4.1.1.1 3.84 Mcps TDD option

A.4.3.4.1.1.2 1.28 Mcps TDD option

This test is to verify the requirement for the E-UTRA TDD to UTRA TDD inter-RAT cell re-selection requirements specified in section 4.2.2.5 when the UTRA cell is of higher priority.

This test scenario comprised of 1 E-UTRA TDD serving cell, and 1 UTRA TDD cell to be re-selected. Test parameters are given in table A.4.3.4.1.1.2-1, A.4.3.4.1.1.2-2, and A.4.3.4.1.1.2-3. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. E-UTRA cell 1 is already identified by the UE prior to the start of the test. Cell 2 is of higher priority than cell 1.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS36.304.

Table A.4.3.4.1.1.2-1: General test parameters for E-UTRAN to UTRAN (1.28 Mcps TDD OPTION) Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	UE is on cell 1 in the initialisation phase, so that reselection to cell 2 occurs during T2
T2 end condition	Active cell		Cell 2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell 1	
T3 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T3
	Neighbour cell		Cell 2	
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
PRACH configuration of cell 1			53	As specified in table 4.7.1-3 in TS 36.211
CP length of cell 1			Normal	
Time offset between cells			3 ms	Asynchronous cells
Access Barring Information		-	Not sent	No additional delays in random access procedure.
$T_{reselection}$		s	0	
DRX cycle length		s	1,28	
HCS			Not used	
T1		s	>20	During T1, cell 2 shall be powered off, and during the off time the primary scrambling code shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2		s	85	T2 needs to be defined so that cell re-selection reaction time is taken into account.
T3		s	25	T3 needs to be defined so that cell re-selection reaction time is taken into account.

Table A.4.3.4.1.1.2-2: Cell specific test parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 1)

Parameter	Unit	Cell 1		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	10		
PBCH_RA	dB	0	0	0
PBCH_RB	dB			
PSS_RB	dB			
SSS_RB	dB			
PCFICH_PA	dB			
PHICH_PA	dB			
PHICH_PB	dB			
PDCCH_PA	dB			
PDCCH_PB	dB			
PDSCH_PA	dB			
PDSCH_PB	dB			
OCNG_RA[Note 1]	dB			
OCNG_RB[Note 1]	dB			

$Q_{rxlevmin}$	dBm/15kHz	-140	-140	-140
N_{oc}	dBm/15kHz	-98		
RSRP	dBm/15kHz	-87	-87	-87
$\hat{E}_s/I_{ot}$	dB	11	11	11
$Thresh_{x, high}$ (Note2)	dB	24(-79dBm)		
$S_{nonintrasearch}$	dB	46		
Propagation Condition		AWGN		
Note1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note2: This refers to the value of $Thresh_{x, high}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell				

Table A.4.3.4.1.1.2-3: Cell specific test parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)					
Timeslot Number		0			DwPTS		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number (Note1)		Channel 2					
PCCPCH_Ec/Ior	dB	-3	-3	-3			
DwPCH_Ec/Ior	dB				0	0	0
OCNS_Ec/Ior	dB	-3	-3	-3			
$\hat{I}_{or}/I_{oc}$	dB	-inf	11	-3	-inf	11	-3
I_{oc}	dBm/1.28 MHz	-80					
PCCPCH RSCP	dBm	-inf	-72	-86	n.a.		
Propagation Condition		AWGN					
$Q_{rxlevmin}$	dBm	-103					
$Qoffset1_{s,n}$	dB	C1, C2: 0					
$Qhyst1_s$	dB	0					
$S_{nonintrasearch}$	dB	Not sent					
$Thresh_{serving, low}$	dB	24 (-79dBm)					
$Thresh_{x, low}$ (Note2)	dB	46 (-94dBm)					
Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note2: This refers to the value of $Thresh_{x, low}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell							

A.4.3.4.1.1.3 7.68 Mcps TDD option

A.4.3.4.1.2 Test Requirements

A.4.3.4.1.2.1 3.84 Mpcs TDD option

A.4.3.4.1.2.2 1.28 Mpcs TDD option

The cell reselection delay to higher priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to higher priority shall be less than 81 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as: $T_{higher\_priority\_search} + T_{evaluateUTRA\_TDD} + T_{SI\_UTRA}$,

Where:

$T_{higher\_priority\_search}$ 60s, See section 4.2.2

$T_{evaluateUTRA\_TDD}$ 19.2s, See Table 4.2.2.5.2-1

T_{SI_UTRA} Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 80.48 s, allow 81 s for higher priority cell reselection in the test case.

A.4.3.4.1.2.3 7.68 Mpcs TDD option

A.4.3.4.2 E-UTRA to UTRA TDD cell re-selection: UTRA is of lower priority

A.4.3.4.2.1 Test Purpose and Environment

A.4.3.4.2.1.1 3.84 Mcps TDD option

A.4.3.4.2.1.2 1.28 Mcps TDD option

This test is to verify the requirement for the E-UTRA TDD to UTRA TDD inter-RAT cell re-selection requirements specified in section 4.2.2.5 when the UTRA cell is of lower priority.

This test scenario comprised of 1 E-UTRA TDD serving cell (Cell 1), and 1 UTRA TDD cell (Cell 2) to be re-selected. Test parameters are given in table A.4.3.4.2.1.2-1, A.4.3.4.2.1.2-2, and A.4.3.4.2.1.2-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Cell 2 is of lower priority than cell 1.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS36.304.

Table A.4.3.4.2.1.2-1: General test parameters for E-UTRAN to UTRAN (1.28 Mcps TDD OPTION) Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN cell
T1 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	1.28 Mcps TDD OPTION cell
T2 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell1	E-UTRA TDD cell
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
PRACH configuration of cell 1			53	As specified in table 4.7.1-3 in TS 36.211
CP length of cell 1			Normal	
Time offset between cells			3 ms	Asynchronous cells
Access Barring Information		-	Not sent	No additional delays in random access procedure.
Treselection		s	0	
DRX cycle length		s	1,28	
HCS			Not used	
T1		s	85	
T2		s	25	

Table A.4.3.4.2.1.2-2: Cell specific test parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RB	dB		
SSS_RB	dB		
PCFICH_PA	dB		
PHICH_PA	dB		
PHICH_PB	dB		
PDCCH_PA	dB		
PDCCH_PB	dB		
PDSCH_PA	dB		
PDSCH_PB	dB		
OCNG_RA Note1	dB		
OCNG_RB Note1	dB		
Qrxlevmin	dBm/15kHz	-140	-140
N_{oc}	dBm/15kHz	-98	
RSRP	dBm/15kHz	-87	-101
$\hat{E}_s / I_{ot}$	dB	11	-3
$S_{nonintrasearch}$	dB	Not sent	
$Thresh_{serving, low}$	dB	46 (-94dBm)	
$Thresh_{x, low}$ (Note2)	dB	24 (-79dBm)	
Propagation Condition		AWGN	
Note1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note2: This refers to the value of $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell			

Table A.4.3.4.2.1.2-3: Cell specific test parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number (Note1)		Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior	dB	-3	-3		
$\hat{I}_{or}/I_{oc}$	dB	11	11	11	11
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-72	-72	n.a.	n.a.
Propagation Condition		AWGN			
Qrxlevmin	dBm	-103			
$Qoffset1_{s,n}$	dB	C1, C2: 0			
$Qhyst1_s$	dB	0			
$Thresh_{x, high}$ (Note2)	dB	46 (-94dBm)			
Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note2: This refers to the value of $Thresh_{x, high}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell					

A.4.3.4.2.1.3 7.68 Mcps TDD option

A.4.3.4.2.2 Test Requirements

A.4.3.4.2.2.1 3.84 Mpcs TDD option

A.4.3.4.2.2.2 1.28 Mpcs TDD option

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA\_TDD} + T_{SI\_UTRA}$,

Where:

$T_{evaluateUTRA\_TDD}$ 19.2s, See Table 4.2.2.5.2-1

T_{SI_UTRA} Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s, allow 21 s for lower priority cell reselection in the test case.

A.4.3.4.2.2.3 7.68 Mpcs TDD option

A.4.3.4.3 EUTRA TDD-UTRA TDD cell reselection in fading propagation conditions: UTRA TDD is of lower priority

A.4.3.4.3.1 Test Purpose and Environment

This test is to verify the requirement for the EUTRA TDD- UTRA TDD inter-RAT cell reselection requirements specified in section 4.2.2.5.2 when the UTRA cell is of lower priority, and to verify the robustness of the UE measurement filtering in a fading environment. The E-UTRA cell is in fading propagation conditions and the UTRA cell is in AWGN propagation conditions.

The test scenario comprises of one UTRA TDD and one E-UTRA TDD cells as given in tables A.4.3.4.3.1-1, A.4.3.4.3.1-2 and A.4.3.4.3.1-3. The test consists of four successive time periods, with time duration of T1 T2, T3 and T4 respectively. Both E-UTRA cell 1 and UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1.

Table A.4.3.4.3.1-1: General test parameters for EUTRA TDD- lower priority UTRA TDD inter RAT cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	
T3 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
	Neighbour cell		Cell1	
E-UTRA PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
E_UTRA Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	<85	T1 need to be defined so that cell re-selection reaction time is taken into account. T1 is terminated when the UE starts to send preambles to cell 1
T2		s	64	The start of T2 is defined as the time when the UE starts to send PRACH preambles to cell 1
T3		s	<25	T3 need to be defined so that cell re-selection reaction time is taken into account. T3 is terminated when the UE starts to send PRACH preambles to cell 2
T4		s	64	The start of T4 is defined as the time when the UE starts to send PRACH preambles to cell 2

Table A.4.3.4.3.1-2: Cell specific test parameters for cell 1 (E-UTRA)

Parameter	Unit	Cell 1			
		T1	T2	T3	T4
E-UTRA RF Channel number		1			
$BW_{channel}$	MHz	10			
OCNG Patterns defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD			
PSS_RA	dB	0			
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA[Note 1]	dB				
OCNG_RB[Note 1]	dB				
Qrxlevmin for UTRA neighbour cell	dBm	-103			
Qrxlevmin	dBm	-140			
N_{oc}	dBm/15 kHz	-104			
RSRP	dBm/15 KHz	-82	-82	-107	-107
$\hat{E}_s/I_{ot}$	dB	22	22	-3	-3
$\hat{E}_s/N_{oc}$	dB	22	22	-3	-3
$Treselection_{EUTRAN}$	s	0			
Snonintrasearch	dB	Not sent			

$Thresh_{serving, low}$	dB	44
$Thresh_{x, low}$ (Note 2)	dB	24
Propagation Condition		ETU70
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2 : This refers to the value of $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell.		

Table A.4.3. 4.3.1-3: Cell specific test parameters for cell 2 (UTRA)

Parameter	Unit	Cell 2 (UTRA)							
Timeslot Number		0				DwPTS			
		T1	T2	T3	T4	T1	T2	T3	T4
UTRA RF Channel Number (Note1)		Channel 2							
PCCPCH_Ec/Ior	dB	-3							
DwPCH_Ec/Ior	dB					0			
OCNS_Ec/Ior	dB	-3							
$\hat{I}_{or}/I_{oc}$	dB	13	13	13	13	13	13	13	13
I_{oc}	dBm/1.28 MHz	-80							
PCCPCH RSCP	dBm	-70	-70	-70	-70	n.a.	n.a.	n.a.	n.a.
Propagation Condition		AWGN							
Qrxlevmin	dBm	-103							
$Qrxlevmin_{EUTRA}$	dBm	-140							
UE_TXPWR_MAX_RACH	dBm	21							
Treselection	s	0							
$Thresh_{x, high}$ (Note2)	dB	44							
Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note2: This refers to the value of $Thresh_{x, high}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell									

A.4.3. 4.3.2 Test Requirements

The probability of reselection from cell 1 to cell 2 during T2 observed during testing shall be less than 10%

The probability of reselection from cell 2 to cell 1 during T4 observed during testing shall be less than 10%

The cell reselection delay to lower priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequene in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2. In order to evaluate reselection delay, the system simulator first needs to verify that the UE is camped on cell 1 at the start of T3

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA\_TDD} + T_{SI\text{-}UTRA}$

Where:

$T_{evaluateUTRA\_TDD}$ 19.2s, See Table 4.2.2.5.2-1

$T_{SI\text{-}UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

A.4.4 E-UTRAN to GSM Cell Re-Selection

A.4.4.1 E-UTRAN FDD – GSM:

A.4.4.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to GSM cell re-selection delay reported in section 4.2.2.5.

This scenario implies the presence of 1 E-UTRAN serving cell, and 1 GSM cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 E-UTRA carrier and 12 GSM cells. Test parameters are given in Table, A.4.4.1-1, A.4.4.1-2, A.4.4.1-3. E-UTRA FDD cell (Cell 1) and GSM cell (cell 2) shall belong to different Location Areas. The test comprises two successive time periods, T1 and T2. During initialization before the start of the test, the UE is camped on cell 1. By the end of T1, the UE has identified BSIC on the GSM BCCH carrier of cell 2 but the signal levels do not meet the reselection criterion during T1. At the start of T2, the signal levels change such that cell 2 satisfies reselection criterion. The GSM layer is configured at a lower priority than the serving E-UTRA FDD layer.

Table A.4.4.1-1: General test parameters for E-UTRA FDD GSM cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	UE shall be forced to cell 1 in the initialisation phase and shall be able to detect and monitor the 4 strongest GSM BCCH carriers in T1 . Cell 1 is an E-UTRA FDD cell.
Final condition	Neighbour cell		Cell2	UE shall perform reselection to cell 2 during T2. Cell 2 is a GSM cell.
E-UTRA RF Channel Number			1	1 E-UTRA FDD carrier frequency
GSM ARFCN			1	12 GSM BCCH carriers are used
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
CP length of cell 1			Normal	
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	35	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	35	T2 need to be defined so that the higher layer search periodicity and cell re-selection reaction time are taken into account.
Propagation channel			AWGN	

Table A.4.4.1-2: Cell-specific test parameters for Cell 1 – E-UTRA FDD cell

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.2 FDD)		OP.2 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		

Qrxlevmin	dBm	-140	
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-89	-102
$\hat{E}_s/I_{ot}$	dB	9	-4
$\hat{E}_s/N_{oc}$	dB	9	-4
$T_{reselectionEUTRAN}$	s	0	
$S_{nonintrasearch}$	dB	Not sent	
$Thresh_{serving, low}$	dB	44	
$Thresh_{x, low}$ (Note 2)	dB	24	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: This refers to $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for GSM target cell.			

Table A.4.4.1-3: Cell-specific test parameters for Cell 2 – GSM cell

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-90	-75
RXLEV_ACCESS_MIN	dBm	-105	
MS_TXPWR_MAX_CCH	dBm	24	

A.4.4.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RR Channel Request message for location update to Cell 2.

The cell re-selection delay shall be less than 26 s + $T_{BCCH,}$ where T_{BCCH} is the maximum time allowed to read BCCH data from GSM cell [8].

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as: 4* $T_{measureGSM}$ + T_{BCCH}, where:

$T_{measureGSM}$ See Table 4.2.2.5.3-1 in section 4.2.2.5.3.

T_{BCCH} Maximum time allowed to read BCCH data from GSM cell [8].
According to [8], the maximum time allowed to read the BCCH data, when being synchronized to a BCCH carrier, is 1.9 s.

This gives a total of 25.6 s + T_{BCCH}, allow 26 s + T_{BCCH} in the test case.

A.4.4.2 E-UTRAN TDD – GSM:

A.4.4.2.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN TDD to GSM cell re-selection delay reported in section 4.2.2.5.

This scenario implies the presence of 1 E-UTRAN serving cell, and 1 GSM cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 E-UTRA carrier and 12 GSM cells. Test parameters are given in Table, A.4.4.2-1, A.4.4.2-2, A.4.4.2-3. E-UTRA TDD cell (Cell 1) and GSM cell (cell 2) shall belong to different Location Areas. The test comprises two successive time periods, T1 and T2. During initialization before the start of the test, the UE is camped on cell 1. By the end of T1, the UE has identified BSIC on the GSM BCCH carrier of cell 2 but the signal levels do not meet the reselection criterion during T1. At the start of T2, the signal levels change such that cell 2 satisfies reselection criterion. The GSM layer is configured at a lower priority than the serving E-UTRA TDD layer.

Table A.4.4.2-1: General test parameters for E-UTRA TDD GSM cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	UE shall be forced to cell 1 in the initialisation phase and shall be able to detect and monitor the 4 strongest GSM BCCH carriers in T1 . Cell 1 is an E-UTRA TDD cell.
Final condition	Neighbour cell		Cell2	UE shall perform reselection to cell 2 during T2. Cell 2 is a GSM cell.
E-UTRA RF Channel Number			1	1 E-UTRA TDD carrier frequency
GSM ARFCN			1	12 GSM BCCH carriers are used
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration for cell 1			6	As specified in table 4.2.1 in TS 36.211
PRACH configuration for cell 1			53	As specified in table 5.7.1-3 in TS 36.211
CP length of cell 1			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	35	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	35	T2 need to be defined so that the higher layer search periodicity and cell re-selection reaction time are taken into account.
Propagation channel			AWGN	

Table A.4.4.2-2: Cell-specific test parameters for Cell 1 – E-UTRA TDD cell

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.2 TDD)		OP.2 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		

Qrxlevmin	dBm	-140	
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-89	-102
$\hat{E}_s/I_{ot}$	dB	9	-4
$\hat{E}_s/N_{oc}$	dB	9	-4
$T_{reselectionEUTRAN}$	s	0	
$S_{nonintrasearch}$	dB	Not sent	
$Thresh_{serving, low}$	dB	44	
$Thresh_{x, low}$ (Note 2)	dB	24	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: This refers to $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for GSM target cell.			

Table A.4.4.2-3: Cell-specific test parameters for Cell 2 – GSM cell

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-90	-75
RXLEV_ACCESS_MIN	dBm	-105	
MS_TXPWR_MAX_CCH	dBm	24	

A.4.4.2.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RR Channel Request message for location update to Cell 2.

The cell re-selection delay shall be less than 26 s + $T_{BCCH,}$ where T_{BCCH} is the maximum time allowed to read BCCH data from GSM cell [8].

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as: 4* $T_{measureGSM}$ + T_{BCCH}, where:

$T_{measureGSM}$ See Table 4.2.2.5.3-1 in section 4.2.2.5.3.

T_{BCCH} Maximum time allowed to read BCCH data from GSM cell [8].
According to [8], the maximum time allowed to read the BCCH data, when being synchronized to a BCCH carrier, is 1.9 s.

This gives a total of 25.6 s + T_{BCCH}, allow 26 s + T_{BCCH} in the test case.

A.4.5 E-UTRAN to HRPD Cell Re-Selection

A.4.5.1 E-UTRAN FDD – HRPD

A.4.5.1.1 E-UTRAN FDD – HRPD Cell Reselection: HRPD is of Lower Priority

A.4.5.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD- HRPD inter-RAT cell reselection requirements specified in section 4.2.2.5.4 when the HRPD cell is of lower priority.

The test scenario comprises of one HRPD and one E-UTRAN FDD cells as given in tables A.4.5.1.1.1-1, A.4.5.1.1.1-2 and A.4.5.1.1.1-3.

The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both E-UTRAN FDD cell 1 and HRPD cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell 2 is of lower priority than cell 1. Cell 1 and cell 2 shall belong to different tracking areas.

Table A.4.5.1.1.1-1: General Test Parameters for E-UTRAN FDD - lower priority HRPD Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbour cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell is selecting during T2
DRX cycle length		s	1.28	
E-UTRA FDD RF Channel Number			1	Only one FDD carrier frequency is used.
E-UTRA FDD Channel Bandwidth ($BW_{channel}$)		MHz	10	
HRPD RF Channel Number			1	Only one HRPD carrier frequency is used.
E-UTRA FDD PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E_UTRA FDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
T1		s	30	
T2		s	30	

Table A.4.5.1.1.1-2: Cell Specific Test Parameters for E-UTRAN FDD (Cell # 1)

Parameter	Unit	Cell 1	
		T1	**T2**
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.2 FDD)		OP.2 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA$^{Note 1}$	dB		
OCNG_RB$^{Note 1}$	dB		
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-89	-102
$\hat{E}_s/I_{ot}$	dB	9	-4
$\hat{E}_s/N_{oc}$	dB	9	-4
$Treselection_{EUTRAN}$	S	0	
Snonintrasearch	dB	Not sent	
cellReselectionPriority	-	1	
Qrxlevmin	dBm	-140	
Qrxlevminoffset	dB	0	
Pcompensation	dB	0	
$\mathbf{S_{ServingCell}}$	dB	51	38
$Thresh_{serving, low}$	dB	44	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.			

Table A.4.5.1.1.1-3: Cell Specific Test Parameters for HRPD (cell # 2)

Parameter	Unit	Cell 2	
		T1	T2
HRPD RF Channel Number		1	
$\frac{\text{Control } E_b}{N_t}$ (38.4 kbps)	dB	21	
$\frac{\text{Control } E_b}{N_t}$ (76.8 kbps)	dB	18	
$\hat{I}_{or}/I_{oc}$	dB	0	0
I_{oc}	dBm/ 1.2288 MHz	-55	
CDMA2000 HRPD Pilot Strength	dB	-3	-3
Propagation Condition		AWGN	
$S_{nonServingCell,x}$		-6	
Treselection	s	0	
hrpd-CellReselectionPriority	-	0	
$Thresh_{x,\ low}$		-14	

A.4.5.1.1.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateHRPD} + T_{SI\text{-}HRPD}$

Where:

$T_{evaluatHRPD}$ See Table 4.2.2.5.4-1

$T_{SI\text{-}HRPD}$ Maximum repetition period of relevant system information blocks that need to be received by the UE to camp on cell 2; 1704 ms is assumed in this test case.

This gives a total of 20.904 s for the lower priority cell reselection, allow 21 s in the test case.

A.4.6 E-UTRAN to cdma2000 1X Cell Re-Selection

A.4.6.1 E-UTRAN FDD – cdma2000 1X

A.4.6.1.1 E-UTRAN FDD – cdma2000 1X Cell Reselection: cdma2000 1X is of Lower Priority

A.4.6.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD- cdma2000 1X inter-RAT cell reselection requirements specified in section 4.2.2.5.5 when the cdma2000 1X cell is of lower priority.

The test scenario comprises of one cdma2000 1X and one E-UTRAN FDD cells as given in tables A.4.6.1.1.1-1, A.4.6.1.1.1-2 and A.4.6.1.1.1-3.

The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both E-UTRAN FDD cell 1 and cdma2000 1X cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell 2 is of lower priority than cell 1. Cell 1 and cell 2 shall belong to different tracking areas.

Table A.4.6.1.1.1-1: General Test Parameters for E-UTRAN FDD - lower priority cdma2000 1X Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbour cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell is selecting during T2
DRX cycle length		s	1.28	
E-UTRA FDD RF Channel Number			1	Only one FDD carrier frequency is used.
E-UTRA FDD Channel Bandwidth ($BW_{channel}$)		MHz	10	
cdma2000 1X RF Channel Number			1	Only one cdma2000 1X carrier frequency is used.
E-UTRA FDD PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E_UTRA FDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
T1		s	30	
T2		s	30	

Table A.4.6.1.1.1-2: Cell Specific Test Parameters for E-UTRAN FDD (Cell # 1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.2 FDD)		OP.2 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 KHz	-89	-102
$\hat{E}_s/I_{ot}$	dB	9	-4
$\hat{E}_s/N_{oc}$	dB	9	-4
$Treselection_{EUTRAN}$	S	0	
Snonintrasearch	dB	Not sent	
cellReselectionPriority	-	1	
Qrxlevmin	dBm	-140	
Qrxlevminoffset	dB	0	
Pcompensation	dB	0	
$\mathbf{S_{ServingCell}}$	dB	51	38
$Thresh_{serving, low}$	dB	44	
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.4.6.1.1.1-3: Cell Specific Test Parameters for cdma2000 1X (cell # 2)

Parameter	Unit	Cell 2	
		T1	T2
cdma2000 1X RF Channel Number		1	
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7	
$\frac{\text{Sync } E_c}{I_{or}}$	dB	-16	
$\frac{\text{Paging } E_c}{I_{or}}$ (4.8 kbps)	dB	-12	
$\hat{I}_{or}/I_{oc}$	dB	0	0
I_{oc}	dBm/ 1.2288 MHz	-55	
CDMA2000 1xRTT Pilot Strength	dB	-10	-10
Propagation Condition		AWGN	
$S_{nonServingCell,x}$		-20	
Treselection	s	0	
oneXRTT-CellReselectionPriority	-	0	
$Thresh_{x, low}$		-28	

A.4.6.1.1.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluatecdma2000\ 1X} + T_{SI\text{-}cdma2000\ 1X}$

Where:

$T_{evaluatcdma2000\ 1X}$ See Table 4.2.2.5.5-1

$T_{SI\text{-}cdma2000\ 1X}$ Maximum repetition period of relevant system information blocks that need to be received by the UE to camp on cell 2; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for the lower priority cell reselection, allow 21 s in the test case.

A.5 E-UTRAN RRC CONNECTED Mode Mobility

A.5.1 E-UTRAN Handover

A.5.1.1 E-UTRAN FDD - FDD Intra frequency handover

A.5.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD intra frequency handover requirements specified in section 5.1.2.1.

The test scenario comprises of 1 E-UTRA FDD carrier and 2 cells as given in tables A.5.1.1.1-1 and A.5.1.1.1-2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.5.1.1.1-1: General test parameters for E-UTRAN FDD-FDD intra frequency handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
A3-Offset		dB	0	
Hysteresis		dB	0	
Time To Trigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells			3 ms	Asynchronous cells
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.1.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra frequency handover test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	- Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	- Infinity	-87	-87
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.5.1.1.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms and is specified in section 11.2 in [2].

$T_{interrupt}$ = 35 ms in the test; $T_{interrupt}$ is defined in section 5.1.2.1.2.

This gives a total of 50 ms.

A.5.1.2 E-UTRAN TDD - TDD Intra frequency handover

A.5.1.2.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD intra frequency handover requirements specified in section 5.2.2.4.

The test scenario comprises of 1 E-UTRA TDD carrier and 2 cells as given in tables A.5.1.2.1-1 and A.5.1.2.1-2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.5.1.2.1-1: General test parameters for E-UTRAN TDD-TDD Intra frequency handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCHPHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
A3-Offset		dB	0	
Hysteresis		dB	0	
Time To Trigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells			3 µs	Synchronous cells
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.1.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Intra frequency handover test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	- Infinity	-87	-87
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.5.1.2.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms and is specified in section 11.2 in [2].

$T_{interrupt}$ = 35 ms in the test; $T_{interrupt}$ is defined in section 5.2.2.4.2.

This gives a total of 50 ms.

A.5.1.3 E-UTRAN FDD – FDD Inter frequency handover

A.5.1.3.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD inter-frequency handover requirements specified in section 5.1.2.1.

The test scenario comprises of two E-UTRA FDD carriers and one cell on each carrier as given in tables A.5.1.3.1-1 and A.5.1.3.1-2. PDCCHs indicating new transmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.5.1.3.1-1: General test parameters for E-UTRAN FDD-FDD Inter frequency handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1
	Neighbouring cell		Cell 2	Cell 2 is on RF channel number 2
Final condition	Active cell		Cell 2	
E-UTRA RF channel number			1, 2	Two FDD carriers are used
Channel Bandwidth ($BW_{channel}$)		MHz	10	
A3-Offset		dB	-4	
Hysteresis		dB	0	
TimeToTrigger		dB	0	
Filter coefficient			0	L3 filtering is not used
DRX			DRX_L	As specified in section A.3.3
PRACH configuration			4	As specified in table 5.7.1-2 in 3GPP TS 36.211
Access Barring Information		-	Not sent	No additional delays in random access procedure
Time offset between cells			3 ms	Asynchronous cells
Gap pattern configuration Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.1.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD Inter frequency handover test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	4	4	4	-Infinity	7	7
N_{oc} Note 2	dBm/15 kHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.5.1.3.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms and is specified in section 11.2 in [2].

$T_{interrupt}$ = 35 ms in the test; $T_{interrupt}$ is defined in section 5.1.2.1.2.

This gives a total of 50 ms.

A.5.1.4 E-UTRAN TDD – TDD Inter frequency handover

A.5.1.4.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD inter frequency handover requirements specified in section 5.2.2.4.

The test scenario comprises of two E-UTRA TDD carriers and one cell on each carrier as given in tables Table A.5.1.4.1-1 and Table A.5.1.4.1-2. PDCCHs indicating new transmissions should be sent continuously to ensure that the

UE would not enter the DRX state. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3.

Table A.5.1.4.1-1: General test parameters for E-UTRAN TDD-TDD Inter frequency handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Gap Pattern Id			1	As specified in 3GPP TS 36.133 section 8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
E-UTRA RF channel number			1, 2	Two TDD carriers are used
Channel Bandwidth ($BW_{channel}$)		MHz	10	
A3-Offset		dB	-4	
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	
DRX			DRX_L	As specified in section A.3.3
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in 3GPP TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in 3GPP TS 36.211
PRACH configuration			53	As specified in table 5.7.1-3 in 3GPP TS 36.211
Time offset between cells			3 μs	Synchronous cells
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.1.4.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Inter frequency handover test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{oc}$	dB	4	4	4	-Infinity	7	7
N_{oc} Note 2	dBm/15 kHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-infinity	-91	-91
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.5.1.4.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms and is specified in section 11.2 in [2].

$T_{interrupt}$ = 35 ms in the test; $T_{interrupt}$ is defined in section 5.2.2.4.2.

This gives a total of 50 ms.

A.5.1.5 E-UTRAN FDD – FDD Inter frequency handover: unknown target cell

A.5.1.5.1 Test Purpose and Environment

This test is to verify the FDD-FDD inter-frequency handover requirements for the case when the target cell is unknown as specified in section 5.1.2.1.

The test scenario comprises of two E-UTRA FDD carriers and one cell on each carrier as given in tables A.5.1.5.1-1 and A.5.1.5.1-2. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and start to transmit the PRACH to Cell 2.

A RRC message implying handover shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.5.1.5.1-1: General test parameters for the E-UTRAN FDD-FDD Inter frequency handover test case when the target cell is unknown

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1
	Neighbouring cell		Cell 2	Cell 2 is on RF channel number 2
Final condition	Active cell		Cell 2	
E-UTRA RF channel number			1, 2	Two FDD carriers are used
Channel Bandwidth ($BW_{channel}$)		MHz	10	
DRX			OFF	Non-DRX test
PRACH configuration			4	As specified in table 5.7.1-2 in 3GPP TS 36.211
Access Barring Information		-	Not sent	No additional delays in random access procedure
Time offset between cells			3 ms	Asynchronous cells
T1		s	≤5	
T2		s	1	

Table A.5.1.5.1-2: Cell specific test parameters for the E-UTRAN FDD-FDD Inter frequency handover test case when the target cell is unknown

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
N_{oc} Note 2	dBm/15 kHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-91
Propagation Condition		AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.5.1.5.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 130 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms, which is specified in section 11.2 in [2].

$T_{interrupt}$ = 115 ms in the test. See section 5.1.2.1.2

This gives a total of 130 ms.

A.5.1.6 E-UTRAN TDD – TDD Inter frequency handover; unknown Target Cell

A.5.1.6.1 Test Purpose and Environment

This test is to verify the TDD-TDD inter-frequency handover requirements for the case when the target cell is unknown as specified in section 5.2.2.4.

The test scenario comprises of two E-UTRA TDD carriers and one cell on each carrier as given in tables A.5.1.6.1-1 and A.5.1.6.1-2. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1, T2 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.5.1.6.1-1: General test parameters for the E-UTRAN TDD-TDD Inter-Frequency handover test case when the target cell is unknown

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in section A.3.2.2.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.3.2.2.2
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1
	Neighbouring cell		Cell 2	Cell 2 is on RF channel number 2
Final condition	Active cell		Cell 2	
E-UTRA RF channel number			1, 2	Two TDD carriers
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
Special subframe configuration			6	As specified in table 4.2-1 in 3GPP TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in 3GPP TS 36.211
PRACH configuration			53	As specified in table 5.7.1-3 in 3GPP TS 36.211
Time offset between cells			3 μs	Synchronous cells
Gap pattern configuration			-	No gap pattern configured
T1		s	≤5	
T2		s	1	

Table A.5.1.6.1-2: Cell specific test parameters for the E-UTRAN TDD-TDD Inter frequency handover test case when the target cell is unknown

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-93
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	5
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-93
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	5
Propagation Condition		AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.5.1.6.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 130 ms from the beginning of time period T2. The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms, which is specified in section 11.2 in [2].

$T_{interrupt}$ = 115 ms in the test. See section 5.2.2.4.2

This gives a total of 130 ms.

A.5.2 E-UTRAN Handover to other RATs

A.5.2.1 E-UTRAN FDD – UTRAN FDD Handover

A.5.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to UTRAN FDD handover requirements specified in section 5.3.1.

The test parameters are given in Tables A.5.2.1.1-1, A.5.2.1.1-2 and A.5.2.1.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.2.1.1-1: General test parameters for E-UTRAN FDD to UTRAN FDD handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN cell
	Neighbouring cell		Cell 2	UTRAN cell
Final condition	Active cell		Cell 2	UTRAN cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD measurement quantity			RSRP	
Inter-RAT (UTRAN FDD) measurement quantity			CPICH Ec/N0	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-UTRA		dB	-18	Absolute UTRAN CPICH Ec/N0 threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		dB	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
UTRA RF Channel Number			1	One UTRA FDD carrier frequency is used.
Monitored UTRA FDD cell list size			12	UTRA cells on UTRA RF channel 1 provided in the cell before T2.
Post-verification period			False	
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.2.1.1-2: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 1)

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$\hat{E}_s/I_{ot}$	dB	0	0	0
N_{oc}	dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$	dB	0	0	0
RSRP Note 2	dBm/15 KHz	-98	-98	-98
Io Note 2	dBm/9 MHz	-67.21	-67.21	-67.21
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				

Table A.5.2.1.1-3: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)		
		T1	T2	T3
CPICH_Ec/Ior	dB	-10		
PCCPCH_Ec/Ior	dB	-12		
SCH_Ec/Ior	dB	-12		
PICH_Ec/Ior	dB	-15		
DCH_Ec/Ior	dB	N/A	N/A	Note 1
OCNS_Ec/Ior	dB	-0.941	0.941	Note 2
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-1.8	-1.8
I_{oc}	dBm/3,84 MHz	-70	-70	-70
CPICH_Ec/Io	dB	-infinity	-14	-14
Propagation Condition		AWGN		
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.				

A.5.2.1.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 190 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms, which is specified in section 5.3.1.1.1.

$T_{interrupt}$ = 140 ms in the test; $T_{interrupt}$ is defined in section 5.3.1.1.2.

This gives a total of 190 ms.

A.5.2.2 E-UTRAN TDD - UTRAN FDD Handover

A.5.2.2.1 Test Purpose and Environment

This test is to verify the E-UTRAN TDD – UTRAN FDD handover requirements specified in section 5.3.1.

The test scenario comprises of one E-UTRAN TDD cell and one UTRAN FDD cell as given in the tables A.5.2.2.1-1, A5.2.2.1-2 and A.5.2.2.1-3. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. At start of time duration T1, the UE does not have any timing information of cell 2. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before the start of T2 to enable the monitoring of UTRAN FDD. A neighbouring cell list, including the UTRAN cell (cell2), shall be sent to the UE before T2 starts. During the time T2 cell 2 becomes detectable and the UE is expected to detect and send the measurement report. A RRC message implying handover shall be sent to the UE during T2, after the UE has reported event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.2.2.1-1: General test parameters for E-UTRAN TDD-UTRAN FDD handover

Parameter		Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)			DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)			DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Initial conditions	Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
	Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Final conditions	Active cell		Cell 2	
Special subframe configuration			6	As specified in table 4.2-1 in 3GPP TS 36.211. Applicable to cell 1.
Uplink-downlink configuration			1	As specified in table 4.2-2 in 3GPP TS 36.211. Applicable to cell 1
E-UTRAN TDD measurement quantity			RSRP	
Inter-RAT (UTRA FDD) measurement quantity			CPICH Ec/Io	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-UTRA		dB	-18	UTRAN FDD CPICH Ec/Io threshold for event B2
Hysteresis		dB	0	
DRX			OFF	No DRX configured.
Time to Trigger		ms	0	
Filter coefficient			0	
CP length			Normal	Applicable to cell 1
Gap pattern configuration Id			0	As specified in Table 8.1.2.1-1; to start before T2 starts
E-UTRA RF Channel Number			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
UTRA RF Channel Number			1	One UTRA FDD carrier frequency is used.
Monitored UTRA FDD cell list size			12	UTRA cells on UTRA RF channel 1 provided in the cell list before T2.
Post-verification period			False	Post verification is not used.
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.2.2.1-2: Cell specific test parameters for E-UTRAN TDD (cell 1) for handover to UTRAN FDD (cell # 2)

Parameter	Unit	Cell 1 (E-UTRAN)		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	10		
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD
PBCH_RA	dB	0		
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note 1				
OCNG_RB Note 1				
RSRP Note 2	dBm/15 kHz	-98	-98	-98
$\hat{E}_s/I_{ot}$	dB	0	0	0
$\hat{E}_s/N_{oc}$	dB	0	0	0
N_{oc}	dBm/15 kHz	-98		
Io Note 2	dBm/9 MHz	-67.21	-67.21	-67.21
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				

Table A.5.2.2.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for handover from E-UTRAN TDD cell (cell #1)

Parameter	Unit	Cell 1 (UTRA)		
		T1	T2	T3
CPICH_Ec/Ior	dB	-10		
PCCPCH_Ec/Ior	dB	-12		
SCH_Ec/Ior	dB	-12		
PICH_Ec/Ior	dB	-15		
DPCH_Ec/Ior	dB	N/A	N/A	Note 1
OCNS	dB	-0.941	-0.941	Note 2
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-1.8	-1.8
I_{oc}	dBm/3.84 MHz	-70		
CPICH_Ec/Io	dB	-infinity	-14	-14
Propagation Condition		AWGN		
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.				

A.5.2.2.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 190 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms, which is specified in section 5.1.1.1.1.

$T_{interrupt}$ = 140 ms in the test; $T_{interrupt}$ is defined in section 5.3.1.1.2.

This gives a total of 190 ms.

A.5.2.3 E-UTRAN FDD- GSM Handover

A.5.2.3.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN to GSM cell handover delay specified in section 5.3.3.

The test parameters are given in Table A.5.2.3.1 -1, A.5.2.3.1 -2 and A.5.2.3.1 -3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 shall be used. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

The RRC message implying handover to cell 2 shall be sent to the UE during period T2, after the UE has reported Event B1. The start of T3 is defined as the end of last E-UTRAN TTI containing the RRC message implying handover.

The requirements are also applicable for a UE not requiring measurement gap, in which case no measurement gap pattern should be sent for the parameters specified in Table A.5.2.3.1 -1.

Table A.5.2.3.1 -1: General test parameters for E-UTRAN FDD-GSM handover

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Gap Pattern Id			1	As specified in TS 36.133 section8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
Inter-RAT measurement quantity			GSM Carrier RSSI	
Threshold other system		dBm	-80	Absolute GSM carrier RSSI threshold for event B1.
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
T1		s	20	
T2		s	7	
T3		s	1	

Table A. A.5.2.3.1 - 2: Cell Specific Parameters for Handover from E- UTRAN FDD to GSM cell case (cell 1)

Parameter	Unit	Cell 1	
		T1, T2	T3
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.2 FDD
PBCH_RA	dB	0	
PBCH_ RB	dB		
PSS_ RA	dB		
SSS_ RA	dB		
PCFICH_ RB	dB		
PHICH_ RA	dB		
PHICH_ RB	dB		
PDCCH_ RA	dB		
PDCCH_ RB	dB		
PDSCH_ RA	dB		
PDSCH_ RB	dB		
OCNG_ RA Note1	dB		
OCNG_ RB Note1	dB		
$\hat{E}_s/I_{ot}$	dB	4	
N_{oc} Note 2	dBm/15 kHz	-98 (AWGN)	
$\hat{E}_s/N_{oc}$	dB	4	
RSRP Note 3	dBm/15kHz	-94	
Propagation Condition		AWGN	

Note 1:	OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3:	RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.2.3.1 - 3: Cell Specific Parameters for Handover from E-UTRAN FDD to GSM cell case (cell 2)

Parameter	Unit	Cell 2 (GSM)	
		T1	T2, T3
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-85	-75

A.5.2.3.2 Test Requirements

The UE shall begin to send access bursts on the new DCCH of the target cell less than 100 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

$T_{\text{Handover delay}}$ = 90 ms (Table 5.3.3.2.1-1) + T_{offset} + T_{UL}

T_{offset} : Equal to 4.65 ms, GSM timing uncertainty between the time from when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

T_{UL}: Equal to 4.65 ms, the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.

This gives a total of 99.3 ms, allow 100 ms in the test case.

A.5.2.4 E-UTRAN TDD - UTRAN TDD Handover

A.5.2.4.1 Test Purpose and Environment

A.5.2.4.1.1 3.84 Mcps TDD option

A.5.2.4.1.2 1.28 Mcps TDD option

This test is to verify the requirement for E-UTRAN TDD to UTRAN TDD handover requirements specified in section 5.3.2.

The test scenario comprises of 1 E-UTRA TDD cell and 1 UTRA TDD cell as given in tables Table A.5.2.4.1.2-1, Table A.5.2.4.1.2-2, and Table A.5.2.4.1.2-3. Gap pattern configuration #0 as defined in table 8.1.2.1-1 is provided.

The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively.

E-UTRAN shall send a RRC message implying handover to UE. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The end of the last TTI containing handover message is begin of T3 duration.

Table A.5.2.4.1.2-1: General test parameters for E-UTRA TDD to UTRA(1.28 Mcps TDD OPTION) handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Initial conditions	Active cell		Cell 1	E-UTRA TDD cell
	Neighbour cell		Cell 2	UTRA 1.28Mcps TDD Cell
Final conditions	Active cell		Cell 2	
Gap Pattern Id			0	As specified in 3GPP TS 36.133 section 8.1.2.1.
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
CP length of cell 1			Normal	
Time offset between cells			3 ms	Asynchronous cells
Access Barring Information			Not Sent	No additional delays in random access procedure.
Hysteresis		dB	0	
Time To Trigger		dB	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
Ofn		dB	0	
Hys		dB	0	
Thresh1		dBm	-93	E-UTRA event B2 threshold
Thresh2		dBm	-80	UTRA event B2 threshold
T1		s	5	
T2		s	≤10	
T3		s	1	

Table A.5.2.4.1.2-2: Cell specific test parameters for E-UTRA TDD to UTRA TDD handover test case (cell 1)

Parameter	Unit	Cell 1		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	10		
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD
PBCH_RA	dB	0	0	0
PBCH_RB	dB			
PSS_RB	dB			
SSS_RB	dB			
PCFICH_PA	dB			
PHICH_PA	dB			
PHICH_PB	dB			
PDCCH_PA	dB			
PDCCH_PB	dB			
PDSCH_PA	dB			
PDSCH_PB	dB			
OCNG_RA^Note 1	dB			
OCNG_RB^Note 1	dB			

$\hat{E}_s/I_{ot}$	dB	13	-3	-3
$\hat{E}_s/N_{oc}$	dB	13	-3	-3
N_{oc}	dBm/15kHz	-98		
RSRP Note 2	dBm/15kHz	-85	-101	-101
SCH_RP Note 2	dBm/15 kHz	-85	-101	-101
Io Note 2	dBm/9MHz	-57.01	-68.45	-68.45
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves				

Table A.5.2.4.1.2-3: Cell specific test parameters for cell search E-UTRA to UTRA case (cell 2)

Parameter	Unit	Cell 2 (UTRA)					
Timeslot Number		0			DwPTS		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number Note 1		Channel 2					
PCCPCH_Ec/Ior	dB	-3					
DwPCH_Ec/Ior	dB				0		
OCNS_Ec/Ior	dB	-3					
$\hat{I}_{or}/I_{oc}$	dB	-3	11	11	-3	11	11
I_{oc}	dBm/1.28 MHz	-80					
PCCPCH RSCP Note 2	dBm	-86	-72	-72	n.a.		
Io Note 2	dBm/1.28 MHz	-78.24	-68.67	-68.67			
Propagation Condition		AWGN					
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: PCCPCH_RSCP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.5.2.4.1.3 7.68 Mcps TDD option

A.5.2.4.2 Test Requirements

A.5.2.4.2.1 3.84 Mcps TDD option

A.5.2.4.2.2 1.28 Mcps TDD option

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 90 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms, which is specified in section 5.3.2.2.1.

$T_{interrupt}$ = 40 ms in the test; $T_{interrupt}$ is defined in section 5.3.2.2.2.

This gives a total of 90 ms.

A.5.2.4.2.3 7.68 Mcps TDD option

A.5.2.5 E-UTRAN FDD – UTRAN TDD Handover

A.5.2.5.1 Test Purpose and Environment

A.5.2.5.1.1 3.84 Mcps TDD option

A.5.2.5.1.2 1.28 Mcps TDD option

This test is to verify the requirement for the E-UTRAN FDD to UTRAN TDD handover requirements specified in section 5.3.2.

The test scenario comprises of two cells, E-UTRA TDD cell1 and UTRA TDD cell2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #1 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring. The test parameters are given in Tables A.5.2.5.1-1, A.5.2.5.1-2 and A.5.2.5.1-3.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.2.5.1.2-1: General test parameters for E-UTRA FDD to UTRA (1.28 Mcps TDD option) handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRA FDD cell
	Neighbour cell		Cell 2	UTRA 1.28Mcps TDD Cell
Final conditions	Active cell		Cell 2	
Gap Pattern Id			1	As specified in 3GPP TS 36.133 section 8.1.2.1.
E-UTRAN FDD measurement quantity			RSRP	
UTRAN TDD measurement quantity			RSCP	
CP length of cell 1			Normal	
Access Barring Information			Not Sent	No additional delays in random access procedure.
Hysteresis		dB	0	
Time To Trigger		dB	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
Ofn		dB	0	
Hys		dB	0	
Thresh1		dBm	-93	Absolute E-UTRAN RSRP threshold for event B2
Thresh2		dBm	-80	Absolute UTRAN RSCP threshold for event B2
T1		s	5	
T2		s	≤ 10	
T3		s	1	

Table A.5.2.5.1.2-2: Cell specific test parameters for E-UTRAN FDD to UTRAN (1.28 Mcps TDD option) handover test case (cell 1)

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$\hat{E}_s/N_{oc}$	dB	13	-3	-3
N_{oc}	dBm/15 kHz	-98		
$\hat{E}_s/I_{ot}$	dB	13	-3	-3
RSRP Note 2	dBm/15 KHz	-85	-101	-101
Io Note 2	dBm/9MHz	-57.01	-68.45	-68.45
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves				

Table A.5.2.5.1.2-3: Cell specific test parameters for E-UTRAN FDD to UTRAN (1.28 Mcps TDD option) handover test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)					
Timeslot Number		0			DwPTS		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number Note 1		Channel 2					
PCCPCH_Ec/Ior	dB	-3					
DwPCH_Ec/Ior	dB				0		
OCNS_Ec/Ior	dB	-3					
$\hat{I}_{or}/I_{oc}$	dB	-3	11	11	-3	11	11
I_{oc}	dBm/1.28 MHz	-80					
PCCPCH RSCP Note 2	dBm	-86	-72	-72	n.a.		
Io Note 2	dBm/1.28 MHz	-78.24	-68.67	-68.67			
Propagation Condition		AWGN					
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: PCCPCH_RSCP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.5.2.5.1.3 7.68 Mcps TDD option

A.5.2.5.2 Test Requirements

A.5.2.5.2.1 3.84 Mcps TDD option

A.5.2.5.2.2 1.28 Mcps TDD option

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 90 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms, which is specified in section 5.3.2.2.1.

$T_{interrupt}$ = 40 ms in the test; $T_{interrupt}$ is defined in section 5.3.2.2.2.

This gives a total of 90 ms.

A.5.2.5.2.3 7.68 Mcps TDD option

A.5.2.6 E-UTRAN TDD - GSM Handover

A.5.2.6.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN to GSM cell handover delay specified in section 5.3.3.

The test parameters are given in Table A.5.2.6.1-1, A.5.2.6.1-2 and A.5.2.6.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 shall be used. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

The RRC message implying handover to cell 2 shall be sent to the UE during period T2, after the UE has reported Event B1. The start of T3 is defined as the end of last E-UTRAN TTI containing the RRC message implying handover.

The requirements are also applicable for a UE not requiring measurement gap, in which case no measurement gap pattern should be sent for the parameters specified in Table A.5.2.6.1-1.

Table A.5.2.6.1-1: General test parameters for E-UTRAN TDD toGSM neighbours handover test case in AWGN propagation condition

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Gap Pattern Id			1	As specified in TS 36.133 section 8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
CP length of cell 1			Normal	
Inter-RAT measurement quantity			GSM Carrier RSSI	
E-UTRA RF Channel Number			1	E-UTRA RF Channel Number
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	E-UTRA Channel Bandwidth ($BW_{channel}$)
Threshold other system		dBm	-80	Absolute GSM carrier RSSI threshold for event B1.
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
T1		s	20	
T2		s	7	
T3		s	1	

Table A.5.2.6.1-2: Cell Specific Parameters for Handover E- UTRAN TDD to GSM handover test case

Parameter	Unit	Cell 1	
		T1, T2	T3
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD
PBCH_RA	dB	0	
PBCH_ RB	dB		
PSS_ RA	dB		
SSS_ RA	dB		
PCFICH_ RB	dB		
PHICH_ RA	dB		
PHICH_ RB	dB		
PDCCH_ RA	dB		
PDCCH_ RB	dB		
PDSCH_ RA	dB		
PDSCH_ RB	dB		
OCNG_ RA Note1	dB		
OCNG_ RB Note1	dB		
$\hat{E}_s/N_{oc}$	dB	4	
N_{oc} Note 2	dBm/15 kHz	-98 (AWGN)	
$\hat{E}_s/I_{ot}$	dB	4	
RSRP Note 3	dBm/15kHz	-94	
Propagation Condition		AWGN	
NOTE 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A A.5.2.6.1-3: Cell Specific Parameters for Handover E-UTRAN to GSM cell case (cell 2)

Parameter	Unit	Cell 2 (GSM)	
		T1	T2, T3
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-85	-75

A.5.2.6.2 Test Requirements

The UE shall begin to send access bursts on the new DCCH of the target cell less than 100 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

$T_{Handover\ delay}$ = 90 ms (Table 5.3.3.2.1-1) + T_{offset} + T_{UL}

T_{offset}: Equal to 4.65 ms, GSM timing uncertainty between the time from when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

T_{UL}: Equal to 4.65 ms, the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.

This gives a total of 99.3 ms, allow 100 ms in the test case.

A.5.2.7 E-UTRAN FDD – UTRAN FDD Handover; Unknown Target Cell

A.5.2.7.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to UTRAN FDD handover requirements for the case when the target cell is unknown as specified in section 5.3.1.

The test parameters are given in Tables A.5.2.7.1-1, A.5.2.7.1-2 and A.5.2.7.1-3. The test consists of two successive time periods, with time durations of T1, T2. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. No Gap pattern configuration shall be used.

Table A.5.2.7.1-1: General test parameters for E-UTRAN FDD to UTRAN FDD handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN cell
	Neighbouring cell		Cell 2	UTRAN cell
Final condition	Active cell		Cell 2	UTRAN cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
E-UTRAN FDD measurement quantity			RSRP	
Inter-RAT (UTRAN FDD) measurement quantity			CPICH Ec/N0	
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
UTRA RF Channel Number			1	One UTRA FDD carrier frequency is used.
Monitored UTRA FDD cell list size			12	UTRA cells on UTRA RF channel 1 provided in the cell before T2.
Post-verification period			False	
T1		s	≤5	
T2		s	1	

Table A.5.2.7.1-2: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 1)

Parameter	Unit	Cell 1 (E-UTRA)	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.2 FDD
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	0	0
N_{oc} Note 2	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	0	0
RSRP Note 3	dBm/15 KHz	-98	-98
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.2.7.1-3: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)	
		T1	T2
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DCH_Ec/Ior	dB	Note 1	
OCNS_Ec/Ior	dB	Note 2	
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-1.8
I_{oc}	dBm/3,84 MHz	-70	-70
CPICH_Ec/Io	dB	-infinity	-14
Propagation Condition	AWGN		
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or} .			

A.5.2.7.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 290 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay is 50ms. See section 5.3.1.1.1.

$T_{interrupt}$ is 240ms. See section 5.3.1.1.2.

This gives a total of 290ms in the test case.

A.5.2.8 E-UTRAN FDD - GSM Handover; Unknown Target Cell

A.5.2.8.1 Test Purpose and Environment

This test is to verify the E-UTRAN FDD to GSM handover requirements for the case when the target GSM cell is unknown as specified in section 5.3.3.

The test parameters are given in Table A.5.2.8.1-1, A.5.2.8.1-2 and A.5.2.8.1-3 below. The test consists of two successive time periods, with time duration of T1, T2 respectively. At the start of time duration T1, the UE will not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. No Gap pattern configuration shall be used.

Table A.5.2.8.1-1: General test parameters for E-UTRAN FDD to GSM handover test case; unknown target cell

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Gap Pattern Id			None	No measurement gaps shall be provided.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
DRX			OFF	No DRX configured
T1		s	≤7	
T2		s	1	

Table A.5.2.8.1 - 2: Cell specific parameters for cell # 1 in E-UTRAN FDD to GSM handover test case; unknown target cell

Parameter	Unit	Cell 1	
		T1	T2
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.2 FDD
PBCH_RA	dB	0	
PBCH_ RB	dB		
PSS_ RA	dB		
SSS_ RA	dB		
PCFICH_ RB	dB		
PHICH_ RA	dB		
PHICH_ RB	dB		
PDCCH_ RA	dB		
PDCCH_ RB	dB		
PDSCH_ RA	dB		
PDSCH_ RB	dB		
OCNG_ RA Note1	dB		
OCNG_ RB Note1	dB		
$\hat{E}_s/I_{ot}$	dB	4	
N_{oc} Note 2	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	
RSRP Note 3	dBm/15 kHz	-94	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.5.2.8.1-3: Cell specific parameters for cell # 2 in E-UTRAN FDD to GSM handover test case; unknown target cell

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-Infinity	-75

A.5.2.8.2 Test Requirements

The UE shall begin to send access bursts on the new DCCH of the target cell less than 200 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

$T_{Handover\ delay}$ = 190 ms (Table 5.3.3.2.1-1) + T_{offset} + T_{UL}

T_{offset}: Equal to 4.65 ms is the GSM timing uncertainty from the time when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure
T_{UL}: Equal to 4.65 ms is the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.

This gives a total of 199.3 ms, allow 200 ms in the test case.

A.5.2.9 E-UTRAN TDD - GSM Handover; Unknown Target Cell

A.5.2.9.1 Test Purpose and Environment

This test is to verify the E-UTRAN TDD to GSM handover requirements for the case when the target GSM cell is unknown as specified in section 5.3.3.

The test parameters are given in Table A.5.2.9.1 -1, A.5.2.9.1 -2 and A.5.2.9.1 -3 below. The test consists of two successive time periods, with time duration of T1, T2 respectively. At the start of time duration T1, the UE will not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. No Gap pattern configuration shall be used.

Table A.5.2.9.1-1: General test parameters for E-UTRAN TDD to GSM handover test case; unknown target cell

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in section A.3.2.2.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.3.2.2.2
Gap Pattern Id			None	No measurement gaps shall be provided.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
DRX			OFF	No DRX configured
Special subframe configuration			6	As specified in table 4.2-1 in 3GPP TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in 3GPP TS 36.211
T1		s	≤7	
T2		s	1	

Table A.5.2.9.1 - 2: Cell specific parameters for cell # 1 in E-UTRAN TDD to GSM handover test case; unknown target cell

Parameter	Unit	Cell 1	
		T1	T2
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD
PBCH_RA	dB	0	
PBCH_ RB	dB		
PSS_ RA	dB		
SSS_ RA	dB		
PCFICH_ RB	dB		
PHICH_ RA	dB		
PHICH_ RB	dB		
PDCCH_ RA	dB		
PDCCH_ RB	dB		
PDSCH_ RA	dB		
PDSCH_ RB	dB		
OCNG_ RA Note1	dB		
OCNG_ RB Note1	dB		
$\hat{E}_s/I_{ot}$	dB	4	
N_{oc} Note 2	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	
RSRP Note 3	dBm/15 kHz	-94	
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.2.9.1 - 3: Cell specific parameters for cell # 2 in E-UTRAN TDD to GSM handover test case; unknown target cell

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-Infinity	-75

A.5.2.9.2 Test Requirements

The UE shall begin to send access bursts on the new DCCH of the target cell less than 200 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

$T_{Handover\ delay}$ = 190 ms (Table 5.3.3.2.1-1) + T_{offset} + T_{UL}

T_{offset}: Equal to 4.65 ms is the GSM timing uncertainty from the time when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure
T_{UL}: Equal to 4.65 ms is the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.
This gives a total of 199.3 ms, allow 200 ms in the test case.

A.5.2.10 E-UTRAN TDD to UTRAN TDD handover: unknown target cell

A.5.2.10.1 Test Purpose and Environment

This test is to verify the requirement for E-UTRAN TDD to UTRAN TDD handover requirements specified in section 5.3.2 when the target UTRAN TDD cell is unknown.

The test scenario comprises of 1 E-UTRAN TDD cell and 1 UTRAN TDD cell as given in tables A.5.2.10.1-1, A.5.2.10.1-2, and A.5.2.10.1-3. No gap pattern is configured in the test case.

The test consists of two successive time periods, with time durations of T1 and T2 respectively. During time duration T1, a RRC message implying handover to UTRA 1.28Mcps TDD cell shall be sent to the UE. The end of the last TTI containing handover message is the beginning of T2 duration.

Table A.5.2.10.1-1: General test parameters for E-UTRAN TDD to unknown UTRAN TDD cell handover test case

<table>
<tr><th colspan="2">Parameter</th><th>Unit</th><th>Value</th><th>Comment</th></tr>
<tr><td colspan="2">PDSCH parameters</td><td></td><td>DL Reference Measurement Channel R.0 TDD</td><td>As specified in section A.3.1.1.2</td></tr>
<tr><td colspan="2">PCFICH/PDCCH/PHICH parameters</td><td></td><td>DL Reference Measurement Channel R.6 TDD</td><td>As specified in section A.3.1.2.2</td></tr>
<tr><td rowspan="2">Initial conditions</td><td>Active cell</td><td></td><td>Cell 1</td><td>E-UTRAN TDD cell</td></tr>
<tr><td>Neighbour cell</td><td></td><td>Cell 2</td><td>UTRA 1.28Mcps TDD cell</td></tr>
<tr><td>Final conditions</td><td>Active cell</td><td></td><td>Cell 2</td><td>UTRA 1.28Mcps TDD cell</td></tr>
<tr><td colspan="2">CP length of cell 1</td><td></td><td>Normal</td><td></td></tr>
<tr><td colspan="2">Uplink-downlink configuration of cell 1</td><td></td><td>1</td><td>As specified in table 4.2.2 in TS 36.211</td></tr>
<tr><td colspan="2">Special subframe configuration of cell 1</td><td></td><td>6</td><td>As specified in table 4.2.1 in TS 36.211</td></tr>
<tr><td colspan="2">Time offset between cells</td><td></td><td>3 ms</td><td>Asynchronous cells</td></tr>
<tr><td colspan="2">Access Barring Information</td><td></td><td>Not Sent</td><td>No additional delays in random access procedure.</td></tr>
<tr><td colspan="2">TimeToTrigger</td><td>dB</td><td>0</td><td></td></tr>
<tr><td colspan="2">Filter coefficient</td><td></td><td>0</td><td>L3 filtering is not used</td></tr>
<tr><td colspan="2">DRX</td><td></td><td>OFF</td><td></td></tr>
<tr><td colspan="2">T1</td><td>s</td><td>5</td><td>During T1, cell 2 shall be powered off, and during the off time the physical layer cell identity shall be changed.</td></tr>
<tr><td colspan="2">T2</td><td>s</td><td>1</td><td></td></tr>
</table>

Table A.5.2.10.1-2: Cell specific test parameters for E-UTRAN TDD to unknown UTRAN TDD cell handover test case (cell 1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
BWchannel	MHz	10	
OCNG Patterns defined in TS36.133 A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RB	dB		
SSS_RB	dB		
PCFICH_PA	dB		
PHICH_PA	dB		
PHICH_PB	dB		
PDCCH_PA	dB		
PDCCH_PB	dB		
PDSCH_PA	dB		
PDSCH_PB	dB		
OCNG_RANote 1	dB		
OCNG_RBNote 1	dB		
$\hat{E}_s/I_{ot}$	dB	3	3
$\hat{E}_s/N_{oc}$	dB	3	3
N_{oc}	dBm/15kHz	-98	
RSRP	dBm/15kHz	-95	-95
SCH_RP	dBm/15 kHz	-95	-95
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.2.10.1-3: Cell specific test parameters for E-UTRAN TDD to unknown UTRAN TDD cell test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number[Note1]		Channel 2			
PCCPCH_Ec/Ior	dB	-3			
DwPCH_Ec/Ior	dB			0	
OCNS_Ec/Ior	dB	-3			
$\hat{I}_{or}/I_{oc}$	dB	-infinity	13	-infinity	13
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-infinity	-70	n.a.	
Propagation Condition		AWGN			

Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

Note2: P-CCPCH RSCP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.5.2.10.2 Test Requirements

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than [280] ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

A.5.3 E-UTRAN Handover to Non-3GPP RATs

A.5.3.1 E-UTRAN FDD – HRPD Handover

A.5.3.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to HRPD handover requirements specified in section 5.4.1.

The test parameters are given in Tables A.5.3.1.1-1, A.5.3.1.1-2 and A.5.3.1.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.1.1-1: General test parameters for E-UTRAN FDD to HRPD handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbouring cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD measurement quantity			RSRP	
Inter-RAT (HRPD) measurement quantity			CDMA2000 HRPD Pilot Strength	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDMA2000		dB	-7	Absolute 'CDMA2000 HRPD Pilot Strength' threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		dB	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
HRPD RF Channel Number			1	One HRPD carrier frequency is used.
HRPD neighbour cell list size			8	HRPD cells on HRPD RF channel 1 provided in the cell list before T2.
cdma2000-SearchWindowSize			8 (60 PN chips)	Search window size as defined in section 6.3.5 in 3GPP TS 36.331
T1		s	5	
T2		s	≤10	
T3		s	1	

Table A.5.3.1.1-2: Cell specific test parameters for E-UTRAN FDD cell#1 for handover to HRPD cell # 2

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
N_{oc} Note 2	dBm/15 kHz	-98		
RSRP Note 3	dBm/15 KHz	-98	-98	-98
$\hat{E}_s/N_{oc}$	dB	0	0	0
$\hat{E}_s/I_{ot}$	dB	0	0	0
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				

Table A.5.3.1.1-3: Cell specific test parameters for HRPD (cell # 2) for handover from E-UTRAN FDD cell (cell #1)

Parameter	Unit	Cell 2 (HRPD)		
		T1	T2	T3
$\frac{\text{Control } E_b}{N_t}$ (38.4 kbps)	dB	21		
$\frac{\text{Control } E_b}{N_t}$ (76.8 kbps)	dB	18		
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0	0
I_{oc}	dBm/1.2288 MHz	-55		
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3	-3
Propagation Condition		AWGN		

A.5.3.1.2 Test Requirements

The UE shall start transmission of the reverse control channel in HRPD to Cell 2 less than 127 ms from the beginning of time period T3.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms, which is specified in section 5.4.1.1.1.

$T_{interrupt}$ = 76.66 ms in the test; $T_{interrupt}$ is defined in section 5.4.1.1.2.

This gives a total of 126.66 ms, allow 127 ms in the test.

A.5.3.2 E-UTRAN FDD – cdma2000 1X Handover

A.5.3.2.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to cdma2000 1X handover requirements specified in section 5.4.2.

The test parameters are given in Tables A.5.3.2.1-1, A.5.3.2.1-2 and A.5.3.2.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.2.1-1: General test parameters for E-UTRAN FDD to cdma2000 1X handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbouring cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD measurement quantity			RSRP	
Inter-RAT (cdma2000 1X) measurement quantity			CDMA2000 1xRTT Pilot Strength	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDMA2000		dB	-14	Absolute 'CDMA2000 1xRTT Pilot Strength' threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		dB	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
cdma2000 1X RF Channel Number			1	One HRPD carrier frequency is used.
cdma2000 1X neighbour cell list size			8	cdma2000 1X cells on cdma2000 1X RF channel 1 provided in the cell list before T2.
cdma2000-SearchWindowSize			8 (60 PN chips)	Search window size as defined in section 6.3.5 in 3GPP TS 36.331
T1		s	5	
T2		s	≤10	
T3		s	1	

Table A.5.3.2.1-2: Cell specific test parameters for E-UTRAN FDD cell#1 for handover to cdma2000 1X cell # 2

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
N_{oc} Note 2	dBm/15 kHz	-98		
RSRP Note 3	dBm/15 KHz	-98	-98	-98
$\hat{E}_s/N_{oc}$	dB	0	0	0
$\hat{E}_s/I_{ot}$	dB	0	0	0
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				

Table A.5.3.2.1-3: Cell specific test parameters for cdma2000 1X (cell # 2) for handover from E-UTRAN FDD cell (cell #1)

Parameter	Unit	Cell 2 (cdma2000 1X)		
		T1	T2	T3
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7		
$\frac{\text{Sync } E_c}{I_{or}}$	dB	-16		
$\frac{\text{Paging } E_c}{I_{or}}$ (4.8 kbps)	dB	-12		
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0	0
I_{oc}	dBm/1.2288 MHz	-55		
CDMA2000 1xRTT Pilot Strength	dB	-infinity	-10	-10
Propagation Condition		AWGN		

A.5.3.2.2 Test Requirements

The UE shall start transmission of the reverse control channel in cdma2000 1X to Cell 2 less than 200 ms from the beginning of time period T3.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 130 ms, which is specified in section 5.4.2.1.1.

$T_{interrupt}$ = 70 ms in the test; $T_{interrupt}$ is defined in section 5.4.2.1.2.

This gives a total of 200 ms.

A.5.3.3 E-UTRAN FDD – HRPD Handover; Unknown Target Cell

A.5.3.3.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to HRPD handover requirements for the case when the target HRPD cell is unknown as specified in section 5.4.1.

The test parameters are given in Tables A.5.3.3.1-1, A.5.3.3.1-2 and A.5.3.3.1-3. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. During time period T1, message containing Information Element *systemTimeInfo* as defined in section 6.3.1 of TS 36.331 [2] shall be sent by the System Simulator (SS). No gap patterns are configured in the test case. No HRPD neighbour cell list shall be provided to the UE.

A RRC message implying handover to the unknown HRPD cell shall be sent to the UE towards the end of the time period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.3.1-1: General test parameters for E-UTRAN FDD to HRPD handover test case; unknown target HRPD cell

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbouring cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
HRPD RF Channel Number			1	One HRPD carrier frequency is used.
cdma2000-SearchWindowSize			8 (60 PN chips)	Search window size as defined in section 6.3.5 in 3GPP TS 36.331
T1		s	≤5	
T2		s	1	

Table A.5.3.3.1-2: Cell specific test parameters for E-UTRAN FDD cell#1 for handover to unknown HRPD cell # 2

Parameter	Unit	Cell 1 (E-UTRAN FDD)	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-98	-98
$\hat{E}_s/N_{oc}$	dB	0	0
$\hat{E}_s/I_{ot}$	dB	0	0
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.5.3.3.1-3: Cell specific test parameters for unknown HRPD (cell # 2) for handover from E-UTRAN FDD cell (cell #1)

Parameter	Unit	Cell 2 (HRPD)	
		T1	T2
$\frac{\text{Control } E_b}{N_t}$ (38.4 kbps)	dB	21	
$\frac{\text{Control } E_b}{N_t}$ (76.8 kbps)	dB	18	
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0
I_{oc}	dBm/1.2288 MHz	-55	
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3
Propagation Condition		AWGN	

A.5.3.3.2 Test Requirements

The UE shall start transmission of the reverse control channel in HRPD to Cell 2 less than 127 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay is expressed as: RRC procedure delay + $T_{interrupt}$, where:

$T_{interrupt}$ also includes time to detect HRPD cell; see section 5.4.1.1.2

This gives a total of 126.66 ms, allow 127 ms in the test case.

A.5.3.4 E-UTRAN FDD – cdma2000 1X Handover; Unknown Target cell

A.5.3.4.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to cdma2000 1X handover requirements for the case when the target cdma2000 1X cell is unknown as specified in section 5.4.2.

The test parameters are given in Tables A.5.3.4.1-1, A.5.3.4.1-2 and A.5.3.4.1-3. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. During time period T1, message containing Information Element *systemTimeInfo* as defined in section 6.3.1 of TS 36.331 [2] shall be sent by the System Simulator (SS). No gap patterns are configured in the test case. No cdma2000 1X neighbour cell list shall be provided to the UE.

A RRC message implying handover to the unknown cdma2000 1X cell shall be sent to the UE towards the end of the time period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.2.1-1: General test parameters for E-UTRAN FDD to cdma2000 1X handover test case; unknown target cdma2000 1X cell

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbouring cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
cdma2000 1X RF Channel Number			1	One HRPD carrier frequency is used.
cdma2000-SearchWindowSize			8 (60 PN chips)	Search window size as defined in section 6.3.5 in 3GPP TS 36.331
T1		s	≤5	
T2		s	1	

Table A.5.3.2.1-2: Cell specific test parameters for E-UTRAN FDD cell#1 for handover to unknown cdma2000 1X cell # 2

Parameter	Unit	Cell 1 (E-UTRAN FDD)	
		T1	**T2**
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-98	-98
$\hat{E}_s/N_{oc}$	dB	0	0
$\hat{E}_s/I_{ot}$	dB	0	0
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.5.3.2.1-3: Cell specific test parameters for unknown cdma2000 1X (cell # 2) for handover from E-UTRAN FDD cell (cell #1)

Parameter	Unit	Cell 2 (cdma2000 1X)	
		T1	**T2**
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7	
$\frac{\text{Sync } E_c}{I_{or}}$	dB	-16	
$\frac{\text{Paging } E_c}{I_{or}}$ (4.8 kbps)	dB	-12	
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0
I_{oc}	dBm/1.2288 MHz	-55	
CDMA2000 1xRTT Pilot Strength	dB	-infinity	-10
Propagation Condition		AWGN	

A.5.3.4.2 Test Requirements

The UE shall start transmission of the reverse control channel in cdma2000 1X to Cell 2 less than 200 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay is expressed as: RRC procedure delay + $T_{interrupt}$, where:

$T_{interrupt}$ also includes time to detect cdma2000 1X cell; see section 5.4.2.1.2

This gives a total of 200 ms.

A.6 RRC Connection Control

A.6.1 RRC Re-establishment

A.6.1.1 E-UTRAN FDD Intra-frequency RRC Re-establishment

A.6.1.1.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA FDD intra-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in section 6.1.2.

The test parameters are given in table A.6.1.1.1-1 and table A.6.1.1.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

Table A.6.1.1.1-1: General test parameters for E-UTRAN FDD intra-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration index			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells		ms	3	Asynchronous cells
T1		s	5	
T2		ms	200	
T3		s	3	

Table A.6.1.1.1-2: Cell specific test parameters for E-UTRAN FDD intra-frequency RRC Re-establishment test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note 1]	dB						
OCNG_RB[Note 1]	dB						

$\hat{E}_s/I_{ot}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	7	-Infinity	-Infinity	4	4	4
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.6.1.1.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to a known E-UTRA FDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re\text{-}establish\_delay} = T_{UL\_grant} + T_{UE\_re\text{-}establish\_delay}.$$

Where:

T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$T_{UE\_re\text{-}establish\_delay}$ = 50 ms + N_{freq}* T_{search} + T_{SI} + T_{PRACH}

N_{freq} = 1

T_{search} = 100 ms

T_{SI} = 1280 ms; it is the time required for receiving all the relevant system information as defined in 3GPP TS 36.331 for the target E-UTRAN FDD cell.

T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, allow 1.5 s in the test case.

A.6.1.2 E-UTRAN FDD Inter-frequency RRC Re-establishment

A.6.1.2.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA FDD inter-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in section 6.1.2.

The test parameters are given in table A.6.1.1.2-1 and table A.6.1.1.2-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of radio link failure. At the start of time period T3, cell 2, which is the neighbour cell, is activated.

Table A.6.1.2.1-1: General test parameters for E-UTRAN FDD inter-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number (cell 1)			1	
E-UTRA RF Channel Number (cell 2)			2	
E-UTRA FDD inter-frequency carrier list size			1	2 E-UTRA FDD carrier frequencies in total: 1 intra-frequency and 1 inter-frequency
Channel Bandwidth ($BW_{channel}$)		MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	5000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration index			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells		ms	3	Asynchronous cells
T1		s	5	
T2		ms	200	
T3		s	5	

Table A.6.1.2.1-2: Cell specific test parameters for E-UTRAN FDD inter-frequency RRC Re-establishment test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	4	-Infinity	-Infinity	-Infinity	-Infinity	7
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	-Infinity	-Infinity	- Infinity	- Infinity	7
RSRP Note 3	dBm/15 KHz	-94	-Infinity	-Infinity	- Infinity	-Infinity	-91
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.6.1.2.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to an unknown E-UTRA FDD inter frequency cell shall be less than 3 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re\text{-}establish\_delay} = T_{UL\_grant} + T_{UE\_re\text{-}establish\_delay}.$$

Where:

T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$T_{UE\_re\text{-}establish\_delay} = 50 \text{ ms} + N_{freq} * T_{search} + T_{SI} + T_{PRACH}$

$N_{freq} = 2$

$T_{search} = 800$ ms

$T_{SI} = 1280$ ms; it is the time required for receiving all the relevant system information as defined in 3GPP TS 36.331 for the target E-UTRAN FDD cell.

T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 2945 ms, allow 3 s in the test case.

A.6.1.3 E-UTRAN TDD Intra-frequency RRC Re-establishment

A.6.1.3.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA TDD intra-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in section 6.1.2.

The test parameters are given in table A.6.1.3.1-1 and table A.6.1.3.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

Table A.6.1.3.1-1: General test parameters for E-UTRAN TDD intra-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells		µs	3	Synchronous cells
T1		s	5	
T2		ms	200	
T3		s	3	

Table A.6.1.3.1-2: Cell specific test parameters for E-UTRAN TDD intra-frequency RRC Re-establishment test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB	0			0		
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	7	-Infinity	-Infinity	4	4	4
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.6.1.3.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to a known E-UTRA TDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re\text{-}establish\_delay} = T_{UL\_grant} + T_{UE\_re\text{-}establish\_delay}.$$

Where:

T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$T_{UE\_re\text{-}establish\_delay}$ = 50 ms + N_{freq}* T_{search} + T_{SI} + T_{PRACH}

N_{freq} = 1

T_{search} = 100 ms

T_{SI} = 1280 ms; it is the time required for receiving all the relevant system information as defined in 3GPP TS 36.331 for the target E-UTRAN TDD cell.

T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, allow 1.5 s in the test case.

A.6.1.4 E-UTRAN TDD Inter-frequency RRC Re-establishment

A.6.1.4.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA TDD inter-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in section 6.1.2.

The test parameters are given in table A.6.1.4.1-1 and table A.6.1.4.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of radio link failure. At the start of time period T3, cell 2, which is the neighbour cell, is activated.

Table A.6.1.4.1-1: General test parameters for E-UTRAN TDD inter-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number (cell 1)			1	
E-UTRA RF Channel Number (cell 2)			2	
E-UTRA TDD inter-frequency carrier list size			1	2 E-UTRA TDD carrier frequencies in total: 1 intra-frequency and 1 inter-frequency
Channel Bandwidth ($BW_{channel}$)		MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	5000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells		µs	3	Synchronous cells
T1		s	5	
T2		ms	200	
T3		s	5	

Table A.6.1.4.1-2: Cell specific test parameters for E-UTRAN TDD inter-frequency RRC Re-establishment test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	4	-Infinity	-Infinity	-Infinity	-Infinity	7
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	-Infinity	-Infinity	- Infinity	- Infinity	7
RSRP Note 3	dBm/15 KHz	-94	-Infinity	-Infinity	- Infinity	-Infinity	-91
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.6.1.4.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to an unknown E-UTRA TDD inter frequency cell shall be less than 3 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re\text{-}establish\_delay} = T_{UL\_grant} + T_{UE\_re\text{-}establish\_delay}.$$

Where:

T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$T_{UE\_re\text{-}establish\_delay}$ = 50 ms + N_{freq}* T_{search} + T_{SI} + T_{PRACH}

N_{freq} = 2

T_{search} = 800 ms

T_{SI} = 1280 ms; it is the time required for receiving all the relevant system information as defined in 3GPP TS 36.331 for the target E-UTRAN TDD cell.

T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 2945 ms, allow 3 s in the test case.

A.6.2 Random Access

A.6.2.1 E-UTRAN FDD – Contention Based Random Access Test

A.6.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Section 6.2.2 and Section 7.1.2 in an AWGN model.

For this test a single cell is used. The test parameters are given in tables A.6.2.1.1-1 and A.6.2.1.1-2.

Table A.6.2.1.1-1: General test parameters for FDD contention based random access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern Note 1		OP.1/2 FDD Note 1	As defined in A.3.2.1.1/2.
PDSCH parameters Note 4		DL Reference Measurement Channel R.0 FDD Note 4	As defined in A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As defined in A.3.1.2.1.
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
Io Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in 3GPP TS 36.331.
Configured UE transmitted power (P_{CMAX})	dBm	23	As defined in clause 6.2.5 in 3GPP TS 36.101.
PRACH Configuration Index	-	4	As defined in table 5.7.1-2 in 3GPP TS 36.211.
Backoff Parameter Index	-	2	As defined in table 7.2-1 in 3GPP TS 36.321.
Propagation Condition	-	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter. Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.			

Table A.6.2.1.1-2: RACH-Configuration parameters for FDD contention based random access test

Field	Value	Comment
powerRampingStep	dB2	
preambleInitialReceivedTargetPower	dBm-120	
preambleTransMax	n6	
ra-ResponseWindowSize	sf10	10 sub-frames
mac-ContentionResolutionTimer	sf48	48 sub-frames
maxHARQ-Msg3Tx	4	
Note: For further information see Section 6.3.2 in 3GPP TS 36.331.		

A.6.2.1.2 Test Requirements

Contention based random access is triggered by *not* explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.6.2.1.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.1.1 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm. The power of the first preamble shall be -30 dBm with an accuracy specified in section 6.3.5.1.1 of 3GPP TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in section 6.3.5.2.1 of 3GPP TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.1.2.2 No Random Access Response Reception

To test the UE behavior specified in subclause 6.2.2.1.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in section 6.3.5.1.1 of 3GPP TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in section 6.3.5.2.1 of 3GPP TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.1.2.3 Receiving a NACK on msg3

To test the UE behavior specified in subclause 6.2.2.1.3 the System Simulator shall NACK *all* UE msg3 following a successful Random Access Response.

The UE shall re-transmit the msg3 upon the reception of a NACK on msg3 until the maximum number of HARQ re-transmissions is reached.

A.6.2.1.2.4 Reception of an Incorrect Message over Temporary C-RNTI

To test the UE behavior specified in Subclause 6.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element *not* matching the CCCH SDU transmitted in msg3 uplink message.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires unless the received message includes a UE Contention Resolution Identity MAC control element and the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message.

A.6.2.1.2.5 Reception of a Correct Message over Temporary C-RNTI

To test the UE behavior specified in Subclause 6.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element matching the CCCH SDU transmitted in the msg3 uplink message.

The UE shall send ACK if the Contention Resolution is successful.

A.6.2.1.2.6 Contention Resolution Timer expiry

To test the UE behavior specified in Subclause 6.2.2.1.6 the System Simulator shall *not* send a response to a msg3.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if the Contention Resolution Timer expires.

A.6.2.2 E-UTRAN FDD – Non-Contention Based Random Access Test

A.6.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Section 6.2.2 and Section 7.1.2 in an AWGN model.

For this test a single cell is used. The test parameters are given in tables A.6.2.2.1-1 and A.6.2.2.1-2.

Table A.6.2.2.1-1: General test parameters for FDD non-contention based random access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern		OP.1 FDD	As defined in A.3.2.1.1.
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As defined in A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As defined in A.3.1.2.1.
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
Io Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in 3GPP TS 36.331.
Configured UE transmitted power (P_{CMAX})	dBm	23	As defined in clause 6.2.5 in 3GPP TS 36.101.
PRACH Configuration Index	-	4	As defined in table 5.7.1-2 in 3GPP TS 36.211.
Backoff Parameter Index	-	2	As defined in table 7.2-1 in 3GPP TS 36.321.
Propagation Condition	-	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.			

Table A.6.2.2.1-2: RACH-Configuration parameters for FDD non-contention based random access test

Field	Value	Comment
powerRampingStep	dB2	
preambleInitialReceivedTargetPower	dBm-120	
preambleTransMax	n6	
ra-ResponseWindowSize	sf10	10 sub-frames
Note: For further information see Section 6.3.2 in 3GPP TS 36.331.		

A.6.2.2.2 Test Requirements

Non-Contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.6.2.2.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.1 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in section 6.3.5.1.1 of 3GPP TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in section 6.3.5.2.1 of 3GPP TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.2.2.2 No Random Access Response Reception

To test the UE behavior specified in subclause 6.2.2.2.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in section 6.3.5.1.1 of 3GPP TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in section 6.3.5.2.1 of 3GPP TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.3 E-UTRAN TDD – Contention Based Random Access Test

A.6.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Section 6.2.2 and Section 7.1.2 in an AWGN model.

For this test a single cell is used. The test parameters are given in tables A.6.2.3.1-1 and A.6.2.3.1-2.

Table A.6.2.3.1-1: General test parameters for TDD contention based random access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number	-	1	
$BW_{channel}$	MHz	10	
OCNG Pattern Note 1	-	OP.1/2 TDD Note 1	As defined in A.3.2.2.1/2.
PDSCH parameters Note 4	-	DL Reference Measurement Channel R.0 TDD Note 4	As defined in A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters	-	DL Reference Measurement Channel R.6 TDD	As defined in A.3.1.2.2.
Special subframe configuration	-	6	As specified in table 4.2-1 in 3GPP TS 36.211.
Uplink-downlink configuration	-	1	As specified in table 4.2-2 in 3GPP TS 36.211.
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
Io Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in 3GPP TS 36.331.
Configured UE transmitted power (P_{CMAX})	dBm	23	As defined in clause 6.2.5 in 3GPP TS 36.101.
PRACH Configuration Index	-	53	As defined in table 5.7.1-3 in 3GPP TS 36.211.
Backoff Parameter Index	-	2	As defined in table 7.2-1 in 3GPP TS 36.321.
Propagation Condition	-	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter. Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.			

Table A.6.2.3.1-2: RACH-Configuration parameters for TDD contention based random access test

Field	Value	Comment
numberOfRA-Preambles	n52	
sizeOfRA-PreamblesGroupA	n52	No group B.
powerRampingStep	dB2	
preambleInitialReceivedTargetPower	dBm-120	
preambleTransMax	n6	
ra-ResponseWindowSize	sf10	10 sub-frames
mac-ContentionResolutionTimer	sf48	48 sub-frames
maxHARQ-Msg3Tx	4	
Note: For further information see Section 6.3.2 in 3GPP TS 36.331.		

A.6.2.3.2 Test Requirements

Contention based random access is triggered by *not* explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.6.2.3.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.1.1 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in section 6.3.5.1.1 of 3GPP TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in section 6.3.5.2.1 of 3GPP TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.3.2.2 No Random Access Response reception

To test the UE behavior specified in Subclause 6.2.2.1.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in section 6.3.5.1.1 of 3GPP TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in section 6.3.5.2.1 of 3GPP TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.3.2.3 Receiving a NACK on msg3

To test the UE behavior specified in Subclause 6.2.2.1.3 the System Simulator shall NACK *all* UE msg3 following a successful Random Access Response.

The UE shall re-transmit the msg3 upon the reception of a NACK on msg3 until the maximum number of HARQ re-transmissions is reached.

A.6.2.3.2.4 Reception of an Incorrect Message over Temporary C-RNTI

To test the UE behavior specified in Subclause 6.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element *not* matching the CCCH SDU transmitted in msg3 uplink message.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires unless the received message includes a UE Contention Resolution Identity MAC control element and the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message.

A.6.2.3.2.5 Reception of a Correct Message over Temporary C-RNTI

To test the UE behavior specified in Subclause 6.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element matching the CCCH SDU transmitted in the msg3 uplink message.

The UE shall send ACK if the Contention Resolution is successful.

A.6.2.3.2.6 Contention Resolution Timer expiry

To test the UE behavior specified in Subclause 6.2.2.1.6 the System Simulator shall *not* send a response to a msg3.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if the Contention Resolution Timer expires.

A.6.2.4 E-UTRAN TDD – Non-Contention Based Random Access Test

A.6.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Section 6.2.2 and Section 7.1.2 in an AWGN model.

For this test a single cell is used. The test parameters are given in tables A.6.2.4.1-1 and A.6.2.4.1-2.

Table A.6.2.4.1-1: General test parameters for TDD non-contention based random access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number	-	1	
$BW_{channel}$	MHz	10	
OCNG Pattern	-	OP.1 TDD	As defined in A.3.2.2.1.
PDSCH parameters	-	DL Reference Measurement Channel R.0 TDD	As defined in A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters	-	DL Reference Measurement Channel R.6 TDD	As defined in A.3.1.2.2.
Special subframe configuration	-	6	As specified in table 4.2-1 in 3GPP TS 36.211.
Uplink-downlink configuration	-	1	As specified in table 4.2-2 in 3GPP TS 36.211.
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
Io Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in 3GPP TS 36.331.
Configured UE transmitted power (P_{CMAX})	dBm	23	As defined in clause 6.2.5 in 3GPP TS 36.101.
PRACH Configuration Index	-	53	As defined in table 5.7.1-3 in 3GPP TS 36.211.
Backoff Parameter Index	-	2	As defined in table 7.2-1 in 3GPP TS 36.321.
Propagation Condition	-	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.			

Table A.6.2.4.1-2: RACH-Configuration parameters for TDD non-contention based random access test

Field	Value	Comment
powerRampingStep	dB2	
preambleInitialReceivedTargetPower	dBm-120	
preambleTransMax	n6	
ra-ResponseWindowSize	sf10	10 sub-frames
Note: For further information see Section 6.3.2 in 3GPP TS 36.331.		

A.6.2.4.2 Test Requirements

Non-Contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.6.2.4.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.1 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in section 6.3.5.1.1 of 3GPP TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in section 6.3.5.2.1 of 3GPP TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.4.2.2 No Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in section 6.3.5.1.1 of 3GPP TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in section 6.3.5.2.1 of 3GPP TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.7 Timing and Signalling Characteristics

A.7.1 UE Transmit Timing

A.7.1.1 E-UTRAN FDD – UE Transmit Timing Accuracy Tests

A.7.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in section 7.1.2.

For this test a single cell is used. Table A.7.1.1.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing is verified by the UE transmitting sounding reference symbols using the configuration defined in Table A.7.1.1.1-2.

Table A.7.1.1.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN FDD

Parameter	Unit	Value		
		Test 1	Test 2	Test 3
E-UTRA RF Channel Number		1	1	1
Channel Bandwidth ($BW_{channel}$)	MHz	10	10	1.4
DRX cycle	ms	OFF	80[Note5]	OFF
PDCCH/PCFICH/PHICH Reference measurement channel[Note1]		R.6 FDD	R.6 FDD	R.8 FDD
OCNG Pattern[Note2]		OP.2 FDD	OP.2 FDD	OP.4 FDD
PBCH_RA	dB	0	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
OCNG_RA[Note3]				
OCNG_RB[Note3]				
N_{oc}	dBm/15 kHz	-98	-98	-98
$\hat{E}_s / I_{ot}$	dB	3	3	3
$\hat{E}_s / N_{oc}$	dB	3	3	3
Io[Note4]	dBm/9 MHz	-65.5	-65.5	N/A
	dBm/1.08 MHz	N/A	N/A	-74.7
Propagation condition	-	AWGN	AWGN	AWGN
Note 1: For the reference measurement channels, see section A.3.1. Note 2: For the OCNG pattern, see section A.3.2. Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 4: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 5: DRX related parameters are defined in Table A.7.1.1.1-3.				

Table A.7.1.1.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for E-UTRAN FDD

Field	Test 1	Test 2	Test 3	Comment
	Value			
srsBandwidthConfiguration	bw5	bw5	bw7	
srsSubframeConfiguration	sc1	sc3	sc1	
ackNackSrsSimultaneousTransmission	FALSE	FALSE	FALSE	
srsMaxUpPTS	N/A	N/A	N/A	Not applicable for FDD
srsBandwidth	0	0	0	No hopping
srsHoppingBandwidth	hbw0	hbw0	hbw0	
frequencyDomainPosition	0	0	0	
duration	TRUE	TRUE	TRUE	Indefinite duration
Srs-ConfigurationIndex	0	77	0	SRS periodicity of 2ms and 80 ms for Test 1 and 2, respectively.
transmissionComb	0	0	0	
cyclicShift	cs0	cs0	cs0	No cyclic shift
Note: For further information see section 6.3.2 in 3GPP TS 36.331.				

Table A.7.1.1.1-3: drx-Configuration to be used in UE Transmit Timing Accuracy Test 2 for E-UTRAN FDD

Field	Test2	Comment
	Value	
onDurationTimer	psf1	
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf80	
shortDRX	disable	
Note: For further information see section 6.3.2 in 3GPP TS 36.331.		

A.7.1.1.2 Test Requirements

For parameters specified in Tables A.7.1.1.1-1 and A.7.1.1.1-2, the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate shall be within the limits defined in section 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

For the 10MHz channel bandwith, the test sequence shall be carried out in RRC_CONNECTED for both non-DRX and DRX with a cycle length of 80 ms (Tests 1 and 2, respectively):

a) After a connection is set up with the cell, the test system shall verify that the UE transmit timing offset is within $N_{TA}\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

b) The test system adjusts the downlink transmit timing for the cell by $+64\times T_S$ (approximately +2μs) compared to that in (a).

c) The test system shall verify that for Test 1 the adjustment step size and the adjustment rate shall be according to the requirements in section 7.1.2 until the UE transmit timing offset is within $N_{TA}\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1. Skip this step for Test 2.

d) The test system shall verify that the UE transmit timing offset stays within $N_{TA}\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

For the 1.4MHz channel bandwith, the test sequence shall be carried out in RRC_CONNECTED for non-DRX (Tests 3):

a) After a connection is set up with the cell, the test system shall verify that the UE transmit timing offset is within $N_{TA}\times T_S \pm 24\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

b) The test system adjusts the downlink transmit timing for the cell by $+128\times T_S$ (approximately +4μs) compared to that in (a).

c) The test system shall verify that the adjustment step size and the adjustment rate shall be according to the requirements in section 7.1.2 until the UE transmit timing offset is within $N_{TA}\times T_S \pm 24\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

d) The test system shall verify that the UE transmit timing offset stays within $N_{TA}\times T_S \pm 24\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

A.7.1.2 E-UTRAN TDD - UE Transmit Timing Accuracy Tests

A.7.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in section 7.1.2.

For this test a single cell is used. Table A.7.1.2.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing is verified by the UE transmitting sounding reference symbols using the configuration defined in Table A.7.1.2.1-2.

Table A.7.1.2.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Parameter	Unit	Value		
		Test 1	**Test 2**	**Test 3**
E-UTRA RF Channel Number		1	1	1
Channel Bandwidth ($BW_{channel}$)	MHz	10	10	1.4
Special subframe configuration[Note1]		6	6	6
Uplink-downlink configuration[Note2]		1	1	1
DRX cycle	ms	OFF	80[Note7]	OFF
PDCCH/PCFICH/PHICH Reference measurement channel[Note3]		R.6 TDD	R.6 TDD	R.8 TDD
OCNG Pattern[Note4]		OP.2 TDD	OP.2 TDD	OP.4 TDD
PBCH_RA	dB	0	0	0
PBCH_RB		0	0	0
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
OCNG_RA[Note5]				
OCNG_RB[Note5]				
N_{oc}	dBm/15 kHz	-98	-98	-98
$\hat{E}_s/I_{ot}$	dB	3	3	3
$\hat{E}_s/N_{oc}$	dB	3	3	3
Io[Note6]	dBm/9 MHz	-65.5	-65.5	N/A
	dBm/1.08 MHz	N/A	N/A	-74.7
Propagation condition	-	AWGN	AWGN	AWGN

Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211.
Note 3: For the reference measurement channels, see section A.3.1.
Note 4: For the OCNG pattern, see section A.3.2.
Note 5: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 6: Io level has been derived from other parameters for information purpose. It is not a settable parameter.
Note 7: DRX related parameters are defined in Table A.7.1.2.1-3.

Table A.7.1.2.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Field	Test 1	Test 2	Tset3	Comment
	Value			
srsBandwidthConfiguration	bw5	bw5	bw7	
srsSubframeConfiguration	sc3	sc3	sc3	Once every 5 subframes
ackNackSrsSimultaneousTransmission	FALSE	FALSE	FALSE	
srsMaxUpPTS	FALSE	FALSE	FALSE	
srsBandwidth	0	0	0	No hopping
srsHoppingBandwidth	hbw0	hbw0	hbw0	
frequencyDomainPosition	0	0	0	
duration	TRUE	TRUE	TRUE	Indefinite duration
Srs-ConfigurationIndex	15	85	15	SRS periodicity of 10 and 80 ms for Test 1 and 2, respectively.
transmissionComb	0	0	0	
cyclicShift	cs0	cs0	cs0	No cyclic shift
Note: For further information see section 6.3.2 in 3GPP TS 36.331.				

Table A.7.1.2.1-3: DRX Configuration to be used in UE Transmit Timing Accuracy Test 2 for E-UTRAN TDD

Field	Test2	Comment
	Value	
onDurationTimer	psf1	
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf80	
shortDRX	disable	
Note: For further information see section 6.3.2 in 3GPP TS 36.331.		

A.7.1.2.2 Test Requirements

For parameters specified in Tables A.7.1.2.1-1 and A.7.1.2.1-2, the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate shall be within the limits defined in section 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

For the 10MHz channel bandwith, the test sequence shall be carried out in RRC_CONNECTED for both non-DRX and DRX with a cycle length of 80 ms (Tests 1 and 2, respectively):

a) After a connection is set up with the cell, the test system shall verify that the UE transmit timing offset is within $(N_{TA} + 624)\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

b) The test system adjusts the downlink transmit timing for the cell by $+64\times T_S$ (approximately +2µs) compared to that in (a).

c) The test system shall verify that for test 1 the adjustment step size and the adjustment rate shall be according to the requirements in section 7.1.2 until the UE transmit timing offset is within $(N_{TA} + 624)\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1. Skip this step for test 2.

d) The test system shall verify that the UE transmit timing offset stays within $(N_{TA} + 624)\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

For the 1.4MHz channel bandwith, the test sequence shall be carried out in RRC_CONNECTED for non-DRX (Tests 3):

a) After a connection is set up with the cell, the test system shall verify that the UE transmit timing offset is within $(N_{TA} +624)\times T_S \pm 24\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

b) The test system adjusts the downlink transmit timing for the cell by $+128\times T_S$ (approximately +4μs) compared to that in (a).

c) The test system shall verify that the adjustment step size and the adjustment rate shall be according to the requirements in section 7.1.2 until the UE transmit timing offset is within $(N_{TA} +624)\times T_S \pm 24\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

d) The test system shall verify that the UE transmit timing offset stays within $(N_{TA} +624)\times T_S \pm 24\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

A.7.2 UE Timing Advance

A.7.2.1 E-UTRAN FDD – UE Timing Advance Adjustment Accuracy Test

A.7.2.1.1 Test Purpose and Environment

The purpose of the test is to verify E-UTRAN FDD Timing Advance adjustment accuracy requirements, defined in section 7.3.2.2, in an AWGN model.

The test parameters are given in tables A.7.2.1.1-1, A.7.2.1.1-2, and A.7.2.1.1-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. In each time period, timing advance commands are sent to the UE and Sounding Reference Signals (SRS), as specified in table A.7.2.1.1-3, are sent from the UE and received by the test equipment. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured.

During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element, as specified in Section 6.1.3.5 in TS 36.321. The Timing Advance Command value shall be set to 31, which according to Section 4.2.3 in TS 36.213 results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance used by the UE is established.

During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements, with Timing Advance Command value specified in table A.7.2.1.1-2. This value shall result in changes of the timing advance used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.

As specified in Section 7.3.2.1, the UE adjusts its uplink timing at sub-frame n+6 for a timing advance command received in sub-frame n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.

The UE Time Alignment Timer, described in Section 5.2 in TS 36.321, shall be configured so that it does not expire in the duration of the test.

Table A.7.2.1.1-1: General Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Timing Advance Command (T_A) value during T1		31	N_{TA} = 0 for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command (T_A) value during T2		39	N_{TA} = 128
DRX		OFF	
T1	s	5	
T2	s	5	

Table A.7.2.1.1-2: Cell specific Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test

Parameter	Unit	Value	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note1	dB		
OCNG_RB Note1	dB		
Timing Advance Command (T_A)		31	39
$\hat{E}_s/I_{ot}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
Io Note2	dBm/9 MHz	-65.5	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter.			

Table A.7.2.1.1-3: Sounding Reference Symbol Configuration for E-UTRAN FDD Transmit Timing Accuracy Test

Field	Value	Comment
srsBandwidthConfiguration	bw5	
srsSubframeConfiguration	sc3	Once every 5 subframes
ackNackSrsSimultaneousTransmission	FALSE	
srsMaxUpPTS	N/A	Not applicable for E-UTRAN FDD
srsBandwidth	0	No hopping
srsHoppingBandwidth	hbw0	
frequencyDomainPosition	0	
Duration	TRUE	Indefinite duration
Srs-ConfigurationIndex	7	SRS periodicity of 10.
transmissionComb	0	
cyclicShift	cs0	No cyclic shift
Note: For further information see section 6.3.2 in 3GPP TS 36.331.		

A.7.2.1.2 Test Requirements

The UE shall apply the signalled Timing Advance value to the transmission timing at the designated activation time i.e. 6 sub frames after the reception of the timing advance command.

The Timing Advance adjustment accuracy shall be within the limits specified in section 7.3.2.2.

The rate of correct Timing Advance adjustments observed during repeated tests shall be at least 90%.

A.7.2.2 E-UTRAN TDD – UE Timing Advance Adjustment Accuracy Test

A.7.2.2.1 Test Purpose and Environment

The purpose of the test is to verify E-UTRAN TDD Timing Advance adjustment accuracy requirements, defined in section 7.3.2.2, in an AWGN model.

The test parameters are given in tables A.7.2.2.1-1, A.7.2.2.1-2, and A.7.2.2.1-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. In each time period, timing advance commands are sent to the UE and Sounding Reference Signals (SRS), as specified in table A.7.2.2.1-3, are sent from the UE and received by the test equipment. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured.

During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element, as specified in Section 6.1.3.5 in TS 36.321. The Timing Advance Command value shall be set to 31, which according to Section 4.2.3 in TS 36.213 results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance used by the UE is established.

During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements, with Timing Advance Command value specified in table A.7.2.1.1-2. This value shall result in changes of the timing advance used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.

As specified in Section 7.3.2.1, the UE adjusts its uplink timing at sub-frame n+6 for a timing advance command received in sub-frame n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.

The UE Time Alignment Timer, described in Section 5.2 in TS 36.321, shall be configured so that it does not expire in the duration of the test.

Table A.7.2.2.1-1: General Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Timing Advance Command (T_A) value during T1		31	N_{TA} = 0 for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command (T_A) value during T2		39	N_{TA} = 128
DRX		OFF	
T1	s	5	
T2	s	5	

Table A.7.2.2.1-2: Cell specific Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test

Parameter	Unit	Value	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
Special subframe configuration[Note1]		6	
Uplink-downlink configuration[Note2]		1	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note3]	dB		
OCNG_RB[Note3]	dB		
Timing Advance Command (T_A)		31	39
$\hat{E}_s/I_{ot}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	**3**	
Io[Note4]	dBm/9 MHz	-65.5	
Propagation Condition		AWGN	
Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211. Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211. Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 4: Io level has been derived from other parameters for information purpose. It is not a settable parameter.			

Table A.7.2.2.1-3: Sounding Reference Symbol Configuration for E-UTRAN TDD Transmit Timing Accuracy Test

Field	Value	Comment
srsBandwidthConfiguration	bw5	
srsSubframeConfiguration	sc3	Once every 5 subframes
ackNackSrsSimultaneousTransmission	FALSE	
srsMaxUpPTS	N/A	
srsBandwidth	bw0	No hopping
srsHoppingBandwidth	hbw0	
frequencyDomainPosition	0	
Duration	TRUE	Indefinite duration
Srs-ConfigurationIndex	15	SRS periodicity of 10ms.
transmissionComb	0	
cyclicShift	cs0	No cyclic shift
Note: For further information see section 6.3.2 in 3GPP TS 36.331.		

A.7.2.2.2 Test Requirements

The UE shall apply the signalled Timing Advance value to the transmission timing at the designated activation time i.e. 6 sub frames after the reception of the timing advance command.

The Timing Advance adjustment accuracy shall be within the limits specified in section 7.3.2.2.

A.7.3 Radio Link Monitoring

In the following section, any uplink signal transmitted by the UE is used for detecting the In-/Out-of-Sync state of the UE. In terms of measurement, the uplink signal is verified on the basis of the UE output power:

- UE output power higher than Transmit OFF power -50 dBm (as defined in TS 36.101 [5] clause 6.3.3.1) means uplink signal
- UE output power equal to or less than Transmit OFF power -50 dBm (as defined in TS 36.101 [5] clause 6.3.3.1) means no uplink signal

A.7.3.1 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync

A.7.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.1.1-1, A.7.3.1.1-2 and A.7.3.1.1-3 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.1.1-4 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Table A.7.3.1.1-1: General test parameters for E-UTRAN FDD out-of-sync testing

Parameter		Unit	Value				Comment
			Test 1	Test 2	Test 3	Test 4	
PCFICH/PDCCH/PHICH parameters			R.6 FDD	R.7 FDD	R.6 FDD	R.7 FDD	As specified in section A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	As specified in section A.3.2.1.2.
Active cell			Cell 1	Cell 1	Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	Normal	Normal	
E-UTRA RF Channel Number			1	1	1	1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	10	10	
Correlation Matrix and Antenna Configuration			1x2 Low	2x2 Low	1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	1A	1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	2	2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	8	8	
	ρ_A, ρ_B		0	-3	0	-3	
	Ratio of PDCCH to RS EPRE	dB	4	1	4	1	
	Ratio of PCFICH to RS EPRE	dB	4	1	4	1	
DRX			OFF	OFF	OFF	OFF	
Layer 3 filtering			Enabled	Enabled	Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	0	0	0	T310 is disabled
T311 timer		ms	1000	1000	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	2	2	2	Minimum CQI reporting periodicity
Propagation channel			AWGN	AWGN	ETU 70 Hz	ETU 70 Hz	.
T1		s	1	1	1	1	
T2		s	0.4	0.4	0.4	0.4	
T3		s	0.5	0.5	0.5	0.5	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.							

Table A.7.3.1.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2

Parameter	Unit	Test 1			Test 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		1x2 Low			2x2 Low		
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD			OP.2 FDD		
ρ_A, ρ_B		0			-3		
PCFICH_RB	dB	4			1		
PDCCH_RA	dB	0			-3		
PDCCH_RB	dB	0			-3		
PBCH_RA	dB	0			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
SNR Note 6	dB	-4.7	-9.5	-13.5	-4.7	-9.5	-13.5
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		AWGN			AWGN		

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.1.1-4.

Table A.7.3.1.1-3: Cell specific test parameters for E-UTRAN FDD (cell # 1) for out-of-sync radio link monitoring tests # 3 and # 4

Parameter	Unit	Test 3			Test 4		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		1x2 Low			2x2 Low		
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD			OP.2 FDD		
ρ_A, ρ_B		0			-3		
PCFICH_RB	dB	4			1		
PDCCH_RA	dB	0			-3		
PDCCH_RB	dB	0			-3		
PBCH_RA	dB	0			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
SNR Note 6	dB	-1.4	-5.5	-11.5	-2.3	-6.2	-12.2
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU 70 Hz			ETU 70 Hz		

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.1.1-4.

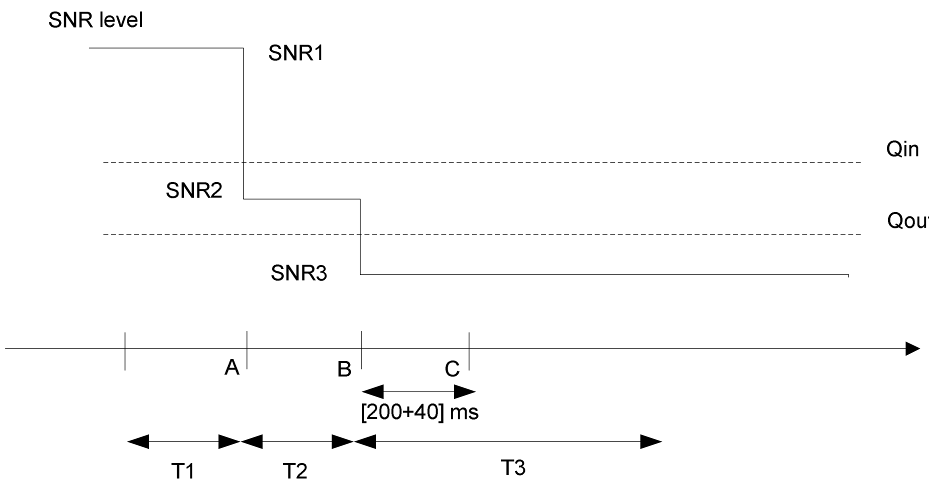

Figure A.7.3.1.1-4 SNR variation for out-of-sync testing

A.7.3.1.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.2 E-UTRAN FDD Radio Link Monitoring Test for In-sync

A.7.3.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.2.1-1 and A.7.3.2.1-2 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.2.1-3 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Table A.7.3.2.1-1: General test parameters for E-UTRAN FDD in-sync testing

Parameter		Unit	Value		Comment
			Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters			R.6 FDD	R.7 FDD	As specified in section A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 FDD	OP.2 FDD	As specified in section A.3.2.1.2.
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	
E-UTRA RF Channel Number			1	1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	
Correlation Matrix and Antenna Configuration			1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
In sync transmission parameters (Note 1)	DCI format		1C	1C	As defined in section 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	4	
	ρ_A, ρ_B		0	-3	
	Ratio of PDCCH to RS EPRE		0	-3	
	Ratio of PCFICH to RS EPRE		4	1	
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	
	ρ_A, ρ_B		0	-3	
	Ratio of PDCCH to RS EPRE	dB	4	1	
	Ratio of PCFICH to RS EPRE	dB	4	1	
DRX			OFF	OFF	
Layer 3 filtering			Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	2000	T310 is enabled
T311 timer		ms	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	2	Minimum CQI reporting periodicity
Propagation channel			ETU 70 Hz	ETU 70 Hz	
T1		s	0.5	0.5	
T2		s	0.4	0.4	
T3		s	1.46	1.46	
T4		s	0.4	0.4	
T5		s	1	1	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.					

Table A.7.3.2.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for in-sync radio link monitoring tests # 1 and # 2

Parameter	Unit	Test 1					Test 2				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1					1				
$BW_{channel}$	MHz	10					10				
Correlation Matrix and Antenna Configuration		1x2 Low					2x2 Low				
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD					OP.2 FDD				
ρ_A, ρ_B		0					-3				
PCFICH_RB	dB	4					1				
PDCCH_RA	dB	0					-3				
PDCCH_RB	dB	0					-3				
PBCH_RA	dB	0					-3				
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PHICH_RA	dB										
PHICH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA Note 1	dB										
OCNG_RB Note 1	dB										
SNR Note 6	dB	-1.4	-5.5	-11.5	-6.4	-1.4	-2.3	-6.2	-12.2	-7.3	-2.3
N_{oc}	dBm/15 kHz	-98					-98				
Propagation condition		ETU 70 Hz					ETU 70 Hz				

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.2.1-3.

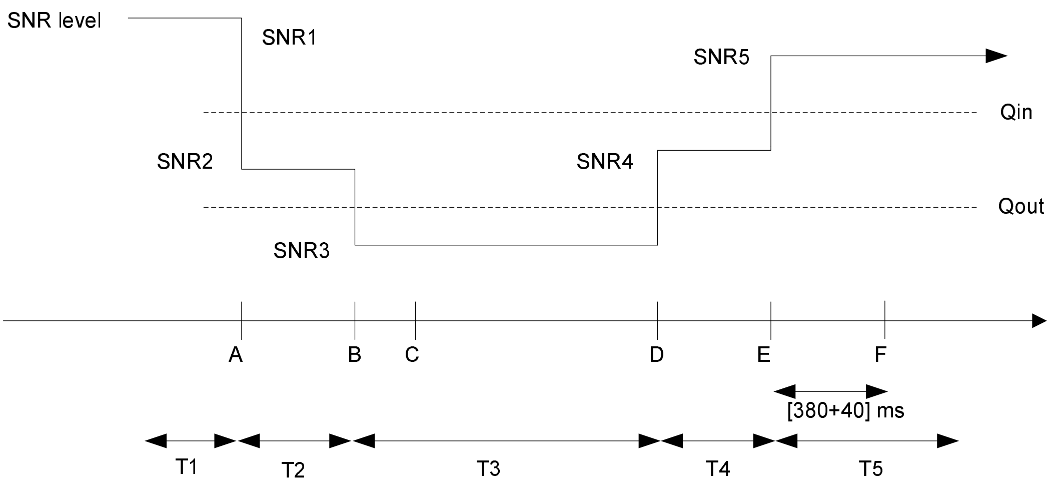

Figure A.7.3.2.1-3 SNR variation for in-sync testing

A.7.3.2.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.3 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync

A.7.3.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.3.1-1, A.7.3.3.1-2 and A.7.3.3.1-3 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.3.1-4 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Table A.7.3.3.1-1: General test parameters for E-UTRAN TDD out-of-sync testing

Parameter		Unit	Value				Comment
			Test 1	Test 2	Test 3	Test 4	
PCFICH/PDCCH/PHICH parameters			R.6 TDD	R.7 TDD	R.6 TDD	R.7 TDD	As specified in section A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	As specified in section A.3.2.2.2.
Active cell			Cell 1	Cell 1	Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	Normal	Normal	
E-UTRA RF Channel Number			1	1	1	1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	10	10	
Correlation Matrix and Antenna Configuration			1x2 Low	2x2 Low	1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	1A	1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	2	2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	8	8	
	ρ_A, ρ_B		0	-3	0	-3	
	Ratio of PDCCH to RS EPRE	dB	4	1	4	1	
	Ratio of PCFICH to RS EPRE	dB	4	1	4	1	
DRX			OFF	OFF	OFF	OFF	
Layer 3 filtering			Enabled	Enabled	Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	0	0	0	T310 is disabled
T311 timer		ms	1000	1000	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	1	1	1	Minimum CQI reporting periodicity
Propagation channel			AWGN	AWGN	ETU 70 Hz	ETU 70 Hz	.
T1		s	1	1	1	1	
T2		s	0.4	0.4	0.4	0.4	
T3		s	0.5	0.5	0.5	0.5	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.							

Table A.7.3.3.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="3">Test 1</th><th colspan="3">Test 2</th></tr>
<tr><th>T1</th><th>T2</th><th>T3</th><th>T1</th><th>T2</th><th>T3</th></tr>
<tr><td>E-UTRA RF Channel Number</td><td></td><td colspan="3">1</td><td colspan="3">1</td></tr>
<tr><td>$BW_{channel}$</td><td>MHz</td><td colspan="3">10</td><td colspan="3">10</td></tr>
<tr><td>Correlation Matrix and Antenna Configuration</td><td></td><td colspan="3">1x2 Low</td><td colspan="3">2x2 Low</td></tr>
<tr><td>Special subframe configuration Note1</td><td></td><td colspan="3">6</td><td colspan="3">6</td></tr>
<tr><td>Uplink-downlink configuration Note2</td><td></td><td colspan="3">1</td><td colspan="3">1</td></tr>
<tr><td>OCNG Pattern defined in A.3.2.2 (TDD)</td><td></td><td colspan="3">OP.2 TDD</td><td colspan="3">OP.2 TDD</td></tr>
<tr><td>ρ_A, ρ_B</td><td></td><td colspan="3">0</td><td colspan="3">-3</td></tr>
<tr><td>PCFICH_RB</td><td>dB</td><td colspan="3">4</td><td colspan="3">1</td></tr>
<tr><td>PDCCH_RA</td><td>dB</td><td colspan="3">0</td><td colspan="3">-3</td></tr>
<tr><td>PDCCH_RB</td><td>dB</td><td colspan="3">0</td><td colspan="3">-3</td></tr>
<tr><td>PBCH_RA</td><td>dB</td><td colspan="3" rowspan="10">0</td><td colspan="3" rowspan="10">-3</td></tr>
<tr><td>PBCH_RB</td><td>dB</td></tr>
<tr><td>PSS_RA</td><td>dB</td></tr>
<tr><td>SSS_RA</td><td>dB</td></tr>
<tr><td>PHICH_RA</td><td>dB</td></tr>
<tr><td>PHICH_RB</td><td>dB</td></tr>
<tr><td>PDSCH_RA</td><td>dB</td></tr>
<tr><td>PDSCH_RB</td><td>dB</td></tr>
<tr><td>OCNG_RA Note 3</td><td>dB</td></tr>
<tr><td>OCNG_RB Note 3</td><td>dB</td></tr>
<tr><td>SNR Note 8</td><td>dB</td><td>-5.1</td><td>-9.1</td><td>-13.1</td><td>-5.2</td><td>-9.2</td><td>-13.2</td></tr>
<tr><td>N_{oc}</td><td>dBm/15 kHz</td><td colspan="3">-98</td><td colspan="3">-98</td></tr>
<tr><td>Propagation condition</td><td></td><td colspan="3">AWGN</td><td colspan="3">AWGN</td></tr>
<tr><td colspan="8">Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.3.1-4.</td></tr>
</table>

Table A.7.3.3.1-3: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring tests # 3 and # 4

Parameter	Unit	Test 3			Test 4		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		1x2 Low			2x2 Low		
Special subframe configuration[Note1]		6			6		
Uplink-downlink configuration[Note2]		1			1		
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD			OP.2 TDD		
ρ_A, ρ_B		0			-3		
PCFICH_RB	dB	4			1		
PDCCH_RA	dB	0			-3		
PDCCH_RB	dB	0			-3		
PBCH_RA	dB	0			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note 3]	dB						
OCNG_RB[Note 3]	dB						
SNR[Note 8]	dB	-1.4	-5.3	-11.3	-2.3	-5.9	-11.9
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU 70 Hz			ETU 70 Hz		

Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.3.1-4.

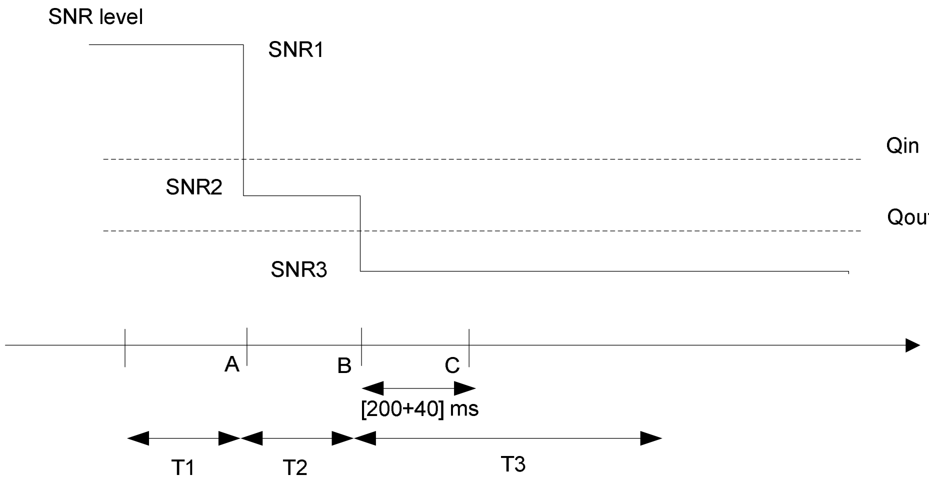

Figure A.7.3.3.1-4. SNR variation for out-of-sync testing

A.7.3.3.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240ms after the start of the time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.4 E-UTRAN TDD Radio Link Monitoring Test for In-sync

A.7.3.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.4.1-1 and A.7.3.4.1-2 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.4.1-3 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Table A.7.3.4.1-1: General test parameters for E-UTRAN TDD in-sync testing

Parameter		Unit	Value		Comment
			Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters			R.6 TDD	R.7 TDD	As specified in section A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD	OP.2 TDD	As specified in section A.3.2.2.2.
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	
E-UTRA RF Channel Number			1	1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	
Correlation Matrix and Antenna Configuration			1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
In sync transmission parameters (Note 1)	DCI format		1C	1C	As defined in section 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	4	
	ρ_A, ρ_B		0	-3	
	Ratio of PDCCH to RS EPRE		0	-3	
	Ratio of PCFICH to RS EPRE		4	1	
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	
	ρ_A, ρ_B		0	-3	
	Ratio of PDCCH to RS EPRE	dB	4	1	
	Ratio of PCFICH to RS EPRE	dB	4	1	
DRX			OFF	OFF	
Layer 3 filtering			Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	2000	T310 is enabled
T311 timer		ms	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	1	Minimum CQI reporting periodicity
Propagation channel			ETU 70 Hz	ETU 70 Hz	
T1		s	0.5	0.5	
T2		s	0.4	0.4	
T3		s	1.46	1.46	
T4		s	0.4	0.4	
T5		s	1	1	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.					

Table A.7.3.4.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for in-sync radio link monitoring tests # 1 and # 2

Parameter	Unit	Test 1					Test 2				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1					1				
$BW_{channel}$	MHz	10					10				
Correlation Matrix and Antenna Configuration		1x2 Low					2x2 Low				
Special subframe configuration[Note1]		6					6				
Uplink-downlink configuration[Note2]		1					1				
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD					OP.2 TDD				
ρ_A, ρ_B		0					-3				
PCFICH_RB	dB	4					1				
PDCCH_RA	dB	0					-3				
PDCCH_RB	dB	0					-3				
PBCH_RA	dB	`									
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PHICH_RA	dB	0					-3				
PHICH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA[Note 3]	dB										
OCNG_RB[Note 3]	dB										
SNR [Note 8]	dB	-1.4	-5.3	-11.3	-6.4	-1.4	-2.3	-5.9	-11.9	-7.3	-2.3
N_{oc}	dBm/15 kHz	-98					-98				
Propagation condition		ETU 70 Hz					ETU 70 Hz				

Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.4.1-3.

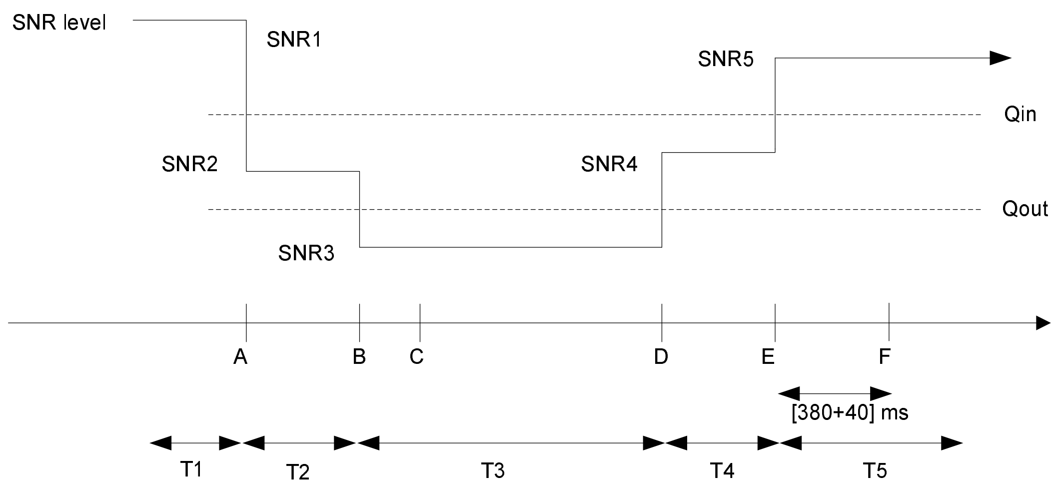

Figure A.7.3.4.1-3. SNR variation for in-sync testing

A.7.3.4.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.5 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync in DRX

A.7.3.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell when DRX is used. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.5.1-1, A.7.3.5.1-2, A.7.3.5.1-3 and A.7.3.5.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.5.1-5 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.7.3.5.1-1: General test parameters for E-UTRAN FDD out-of-sync tests in DRX

Parameter		Unit	Value		Comment
			Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters			R.7 FDD	R.6 FDD	As specified in section A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 FDD	OP.2 FDD	As specified in section A.3.2.1.2.
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	
E-UTRA RF Channel Number			1	1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	
Correlation Matrix and Antenna Configuration			2x2 Low	1x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	
	ρ_A, ρ_B		-3	0	
	Ratio of PDCCH to RS EPRE	dB	1	4	
	Ratio of PCFICH to RS EPRE	dB	1	4	
DRX cycle		ms	40	1280	See Table A.7.3.5.1-3
Layer 3 filtering			Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	0	T310 is disabled
T311 timer		ms	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	2	Minimum CQI reporting periodicity
Propagation channel			ETU 70 Hz	AWGN	.
T1		s	4	32	
T2		s	1.6	12.8	
T3		s	1.8	13	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.					

Table A.7.3.5.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2 in DRX

Parameter	Unit	Test 1			Test 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		2x2 Low			1x2 Low		
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD			OP.2 FDD		
ρ_A, ρ_B		-3			0		
PCFICH_RB	dB	1			4		
PDCCH_RA	dB	-3			0		
PDCCH_RB	dB	-3			0		
PBCH_RA	dB	-3			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note1	dB						
OCNG_RB Note1	dB						
SNR Note 6	dB	-2.3	-6.2	-12.2	-4.7	-9.5	-13.5
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU 70 Hz			AWGN		

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.5.1-5.

Table A.7.3.5.1-3: DRX-Configuration for E-UTRAN FDD out-of-sync tests

Field	Test1 Value	Test2 Value	Comment
onDurationTimer	psf2	psf2	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	sf1	sf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.7.3.5.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD out-of-sync testing

Field	Test1 Value	Test2 Value	Comment
TimeAlignmentTimer	infinity	infinity	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

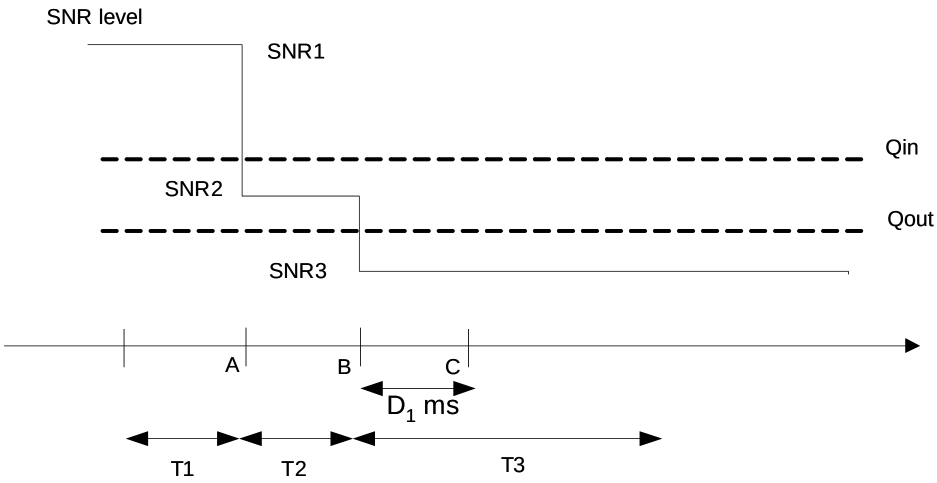

Figure A.7.3.5.1-5 SNR variation for out-of-sync testing in DRX

A.7.3.5.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

In test 1 and test 2 during the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according the configured CQI reporting mode (PUCCH 1-0).

In test 1 the UE shall stop transmitting uplink signal no later than time point C (duration D_1 = 900 ms after the start of time duration T3).

In test 2 the UE shall stop transmitting uplink signal no later than time point C (duration D_1 = 6500 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.6 E-UTRAN FDD Radio Link Monitoring Test for In-sync in DRX

A.7.3.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell when DRX is used. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.6.1-1, A.7.3.6.1-2, A.7.3.6.1-3 and A.7.3.6.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.6.1-5 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.6.1-1: General test parameters for E-UTRAN FDD in-sync test in DRX

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters			R.6 FDD	As specified in section A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 FDD	As specified in section A.3.2.1.2.
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
Correlation Matrix and Antenna Configuration			1x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
In sync transmission parameters (Note 1)	DCI format		1C	As defined in section 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE		0	
	Ratio of PCFICH to RS EPRE		4	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle		ms	40	See Table A.7.3.6.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
Propagation channel			AWGN	
T1		s	4	
T2		s	1.6	
T3		s	1.46	
T4		s	0.4	
T5		s	4	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.6.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for in-sync radio link monitoring test # 1 in DRX

Parameter	Unit	Test 1				
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1				
$BW_{channel}$	MHz	10				
Correlation Matrix and Antenna Configuration		1x2 Low				
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD				
ρ_A, ρ_B		0				
PCFICH_RB	dB	4				
PDCCH_RA	dB	0				
PDCCH_RB	dB	0				
PBCH_RA	dB	0				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA Note1	dB					
OCNG_R B Note1	dB					
SNR Note 8	dB	-4.7	-9.5	-13.5	-8.7	-4.7
N_{oc}	dBm/15 kHz	-98				
Propagation condition		AWGN				

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.6.1-5.

Table A.7.3.6.1-3: DRX-Configuration for E-UTRAN FDD out-of-sync tests

Field	Value	Comment
onDurationTimer	psf2	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf40	
shortDRX	disable	

Table A.7.3.6.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD out-of-sync testing

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

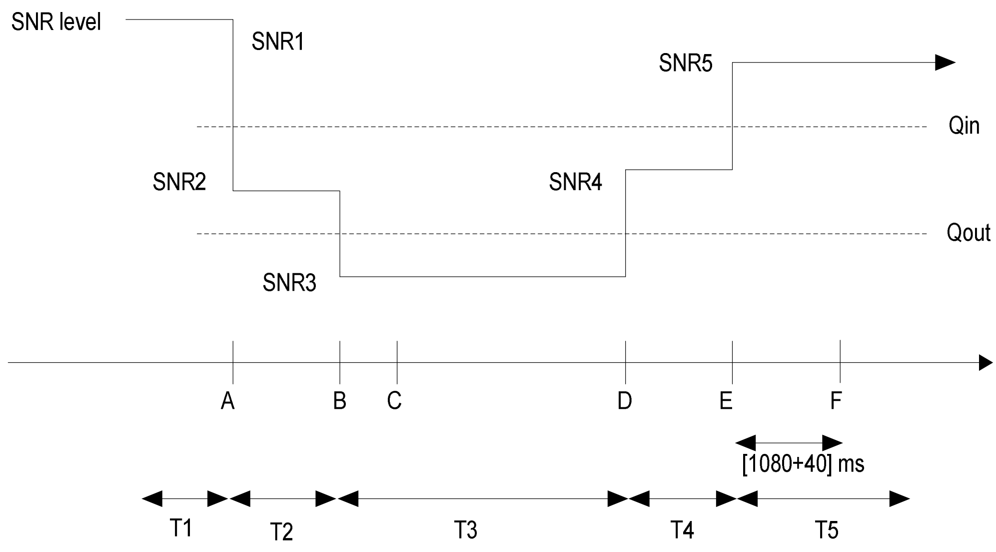

Figure A.7.3.6.1-5 SNR variation for in-sync testing in DRX

A.7.3.6.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 to T5 the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.7 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync in DRX

A.7.3.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.7.1-1, A.7.3.7.1-2, A.7.3.7.1-3 and A.7.3.7.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.7.1-5 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.7.3.7.1-1: General test parameters for E-UTRAN TDD out-of-sync tests in DRX

Parameter		Unit	Value		Comment
			Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters			R.7 TDD	R.6 TDD	As specified in section A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD	OP.2 TDD	As specified in section A.3.2.2.2.
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	
E-UTRA RF Channel Number			1	1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	
Correlation Matrix and Antenna Configuration			2x2 Low	1x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	
	ρ_A, ρ_B		-3	0	
	Ratio of PDCCH to RS EPRE	dB	1	4	
	Ratio of PCFICH to RS EPRE	dB	1	4	
DRX cycle		ms	40	1280	See Table A.7.3.7.1-3
Layer 3 filtering			Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	0	T310 is disabled
T311 timer		ms	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	1	Minimum CQI reporting periodicity
Propagation channel			ETU 70 Hz	AWGN	.
T1		s	4	32	
T2		s	1.6	12.8	
T3		s	1.8	13	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.					

Table A.7.3.7.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2 in DRX

Parameter	Unit	Test 1			Test 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		2x2 Low			1x2 Low		
Special subframe configuration[Note1]		6			6		
Uplink-downlink configuration[Note2]		1			1		
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD			OP.2 TDD		
ρ_A, ρ_B		-3			0		
PCFICH_RB	dB	1			4		
PDCCH_RA	dB	-3			0		
PDCCH_RB	dB	-3			0		
PBCH_RA	dB	-3			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note3]	dB						
OCNG_RB[Note3]	dB						
SNR [Note 8]	dB	-2.3	-5.9	-11.9	-5.1	-9.1	-13.1
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU 70 Hz			AWGN		

Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.7.1-5.

Table A.7.3.7.1-3: DRX-Configuration for E-UTRAN TDD out-of-sync tests

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf2	psf2	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	sf1	sf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.7.3.7.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD out-of-sync testing

Field	Test1 Value	Test2 Value	Comment
TimeAlignmentTimer	infinity	infinity	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

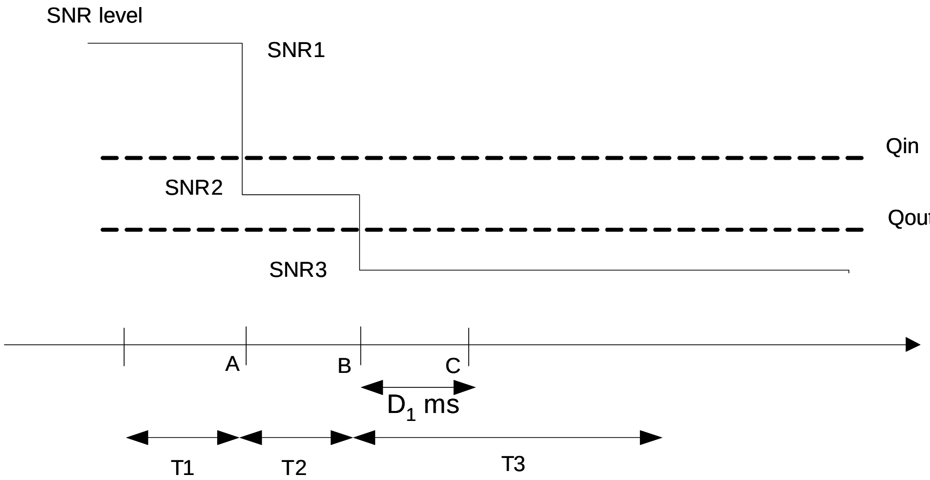

Figure A.7.3.7.1-5 SNR variation for out-of-sync testing in DRX

A.7.3.7.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

In test 1 and test 2 during the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe according to the configured CQI reporting mode (PUCCH 1-0).

In test 1 the UE shall stop transmitting uplink signal no later than time point C (duration D_1 = 900 ms after the start of time duration T3).

In test 2 the UE shall stop transmitting uplink signal no later than time point C (duration D_1 = 6500 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.8 E-UTRAN TDD Radio Link Monitoring Test for In-sync in DRX

A.7.3.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.8.1-1, A.7.3.8.1-2, A.7.3.8.1-3 and A.7.3.8.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.8.1-5 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.7.3.8.1-1: General test parameters for E-UTRAN TDD in-sync test in DRX

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters			R.6 TDD	As specified in section A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD	As specified in section A.3.2.2.2
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	
E-UTRA RF Channel Number			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
Correlation Matrix and Antenna Configuration			1x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
In sync transmission parameters (Note 1)	DCI format		1C	As defined in section 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE		0	
	Ratio of PCFICH to RS EPRE		4	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle		ms	40	See Table A.7.3.8.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	Minimum CQI reporting periodicity
Propagation channel			AWGN	
T1		s	4	
T2		s	1.6	
T3		s	1.46	
T4		s	0.4	
T5		s	4	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.8.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for in-sync radio link monitoring test # 1 in DRX

Parameter	Unit	Test 1				
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1				
$BW_{channel}$	MHz	10				
Correlation Matrix and Antenna Configuration		1x2 Low				
Special subframe configuration[Note1]		6				
Uplink-downlink configuration[Note2]		1				
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD				
ρ_A, ρ_B		0				
PCFICH_RB	dB	4				
PDCCH_RA	dB	0				
PDCCH_RB	dB	0				
PBCH_RA	dB	0				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA[Note3]	dB					
OCNG_RB[Note3]	dB					
SNR [Note 8]	dB	-5.1	-9.1	-13.1	-9.1	-5.1
N_{oc}	dBm/15 kHz	-98				
Propagation condition		AWGN				

Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.8.1-5.

Table A.7.3.8.1-3: DRX-Configuration for E-UTRAN TDD out-of-sync tests

Field	Value	Comment
onDurationTimer	psf2	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf40	
shortDRX	disable	

Table A.7.3.8.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD out-of-sync testing

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

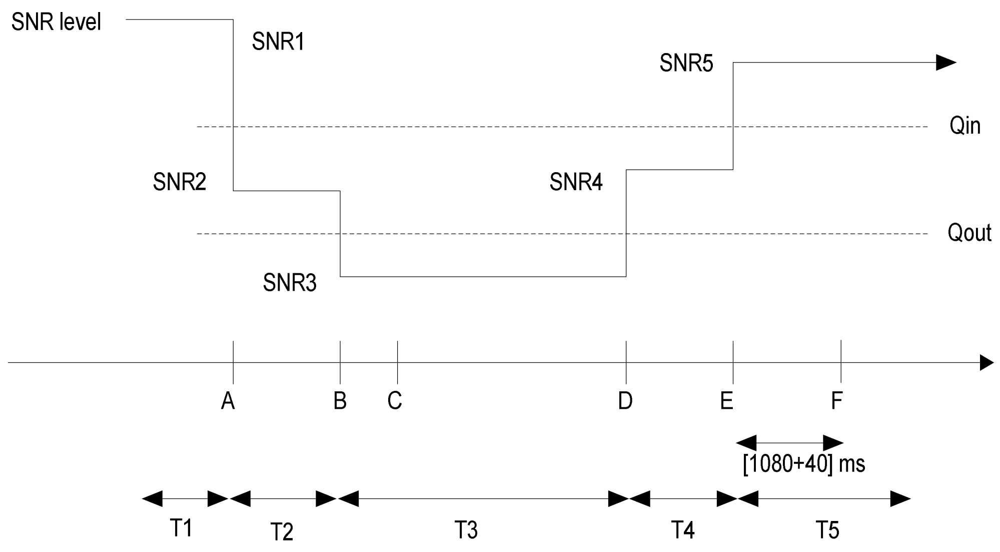

Figure A.7.3.8.1-5 SNR variation for in-sync testing in DRX

A.7.3.8.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe acc to ording the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.8 UE Measurements Procedures

The reference channels in this section assume transmission of PDSCH with a maximum number of 5 HARQ transmissions unless otherwise specified.

A.8.1 E-UTRAN FDD Intra-frequency Measurements

A.8.1.1 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells

A.8.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD intra-frequency cell search requirements in section 8.1.2.2.1.1.

The test parameters are given in Table A.8.1.1.1-1 and A.8.1.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.1.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
Time offset between cells		3 ms	Asynchronous cells
T1	s	5	
T2	s	5	

Table A.8.1.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_PB	dB				
PDCCH_RA	dB				
PDCCH_PB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.8.1.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.1.2 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

A.8.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD intra-frequency cell search requirements in section 8.1.2.2.1.1

The test parameters are given in Table A.8.1.2.1-1 and A.8.1.2.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions or retransmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.2.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	dB	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in section A.3.3
Time offset between cells		3 µs	Synchronous cells
T1	s	5	
T2	s	5	

Table A.8.1.2.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.1.2.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.1.3 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX

A.8.1.3.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. The tests will partly verify the FDD-FDD intra-frequency cell search in DRX requirements in section 8.1.2.2.1.2.

The test parameters are given in Tables A.8.1.3.1-1, A.8.1.3.1-2, A.8.1.3.1-3 and A.8.1.3.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.1.3.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PDSCH parameters		DL Reference Measurement Channel R.0 FDD		As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD		As specified in section A.3.1.2.1
Active cell		Cell 1		
Neighbour cell		Cell 2		Cell to be identified.
E-UTRA RF Channel Number		1		One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10		
A3-Offset	dB	-6		
CP length		Normal		
Hysteresis	dB	0		
Time To Trigger	dB	0		
Filter coefficient		0		L3 filtering is not used
DRX		ON		DRX related parameters are defined in Table A.8.1.3.1-3
Time offset between cells		3 μs		Synchronous cells
T1	s	5		
T2	s	5	30	

Table A.8.1.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
N_{oc} Note 2	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table A.8.1.3.1-3: DRX-Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1 Value	Test2 Value	Comment
onDurationTimer	psf1	psf1	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	sf1	sf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.1.3.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1 Value	Test2 Value	Comment
TimeAlignmentTimer	sf500	sf500	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

A.8.1.3.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 25600 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.1.4 Void

A.8.2 E-UTRAN TDD Intra-frequency Measurements

A.8.2.1 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

A.8.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD intra-frequency cell search requirements in section 8.1.2.2.2.1.

The test parameters are given in Table A.8.2.1.1-1 and A.8.2.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions or retransmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.2.1.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in section A.3.3
Time offset between cells		3 µs	Synchronous cells
T1	s	5	
T2	s	5	

Table A.8.2.1.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.2.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.2.2 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX

A.8.2.2.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. The tests will partly verify the TDD-TDD intra-frequency cell search in DRX requirements in section 8.1.2.2.1.2.

The test parameters are given in Tables A.8.1.3.1-1, A.8.1.3.1-2, A.8.1.3.1-3 and A.8.1.3.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.2.2.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PDSCH parameters		DL Reference Measurement Channel R.0 TDD		As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD		As specified in section A.3.1.2.2
Active cell		Cell 1		
Neighbour cell		Cell 2		Cell to be identified.
E-UTRA RF Channel Number		1		One TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10		
A3-Offset	dB	-6		
CP length		Normal		
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1		As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
Hysteresis	dB	0		
Time To Trigger	s	0		
Filter coefficient		0		L3 filtering is not used
DRX		ON		DRX related parameters are defined in Table A.8.2.2.1-3
Time offset between cells		3 μs		Synchronous cells
T1	s	5		
T2	s	5	30	

Table A.8.2.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 kHz	-98			
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.2.2.1-3: DRX-Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1 Value	Test2 Value	Comment
onDurationTimer	psf1	psf1	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	sf1	sf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.2.2.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1 Value	Test2 Value	Comment
TimeAlignmentTimer	sf500	sf500	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section 10.1 in 3GPP TS 36.213.

A.8.2.2.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 25600 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.3 E-UTRAN FDD - FDD Inter-frequency Measurements

A.8.3.1 E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

A.8.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD-FDD inter-frequency cell search requirements in section 8.1.2.3.

The test parameters are given in Tables A.8.3.1.1-1 and A.8.3.1.1-2. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.3.1.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Gap Pattern Id		0	As specified in 3GPP TS 36.133 section 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between cells		3 ms	Asynchronous cells
T1	s	5	
T2	s	5	

Table A.8.3.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.3.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.3.2 E-UTRAN FDD-FDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

A.8.3.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These test will partly verify the FDD-FDD inter-frequency cell search requirements when DRX is used in section 8.1.2.3.

The common test parameters are given in Tables A.8.3.2.1-1 and A.8.3.2.1-2. DRX configuration for Test1 and Test2 are given in Table A.8.3.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.3.2.1-4. In this tests, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The tests consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.3.2.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Parameter	Unit	Test 1	Test 2	Comment
		Value		
PDSCH parameters		DL Reference Measurement Channel R.0 FDD		As specified in section A.3.1.1.1 Note that UE may only be allocated at *On Duration*
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD		As specified in section A.3.1.2.1.
E-UTRA RF Channel Number		1, 2		Two FDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10		
Active cell		Cell 1		Cell 1 is on RF channel number 1
Neighbour cell		Cell 2		Cell 2 is on RF channel number 2
Gap Pattern Id		0		As specified in 3GPP TS 36.133 section 8.1.2.1.
A3-Offset	dB	-6		
Hysteresis	dB	0		
CP length		Normal		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
PRACH configuration		4		As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.3.2.1-3
Time offset between cells		3 ms		Asynchronous cells
T1	s	5		
T2	s	5	30	

Table A.8.3.2.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 kHz	-98			
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.3.2.1-3: drx-Configuration to be used in E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1 Value	Test2 Value	Comment
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	sf1	sf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Note: For further information see section 6.3.2 in 3GPP TS 36.331.

Table A.8.3.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1 Value	Test2 Value	Comment
TimeAlignmentTimer	sf500	sf500	For further information see section 6.3.2 in 3GPP TS 36.331.
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213..

A.8.3.2.2 Test Requirements

In Test1 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 20*1280ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report

A.8.3.3 E-UTRAN FDD-FDD inter-frequency event triggered reporting under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

A.8.3.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX when L3 filtering is used. This test will partly verify the FDD-FDD inter-frequency cell search in DRX requirements in section 8.1.2.3.1.2 and the UE behaviour with the *filterCoefficent* defined in [2].

The test parameters are given in Tables A.8.3.3.1-1, A.8.3.3.1-2, A.8.3.3.1-3 and A.8.3.3.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 and the filter coefficient is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 1 as defined in Table 8.1.2.1-1 is provided.

The uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.3.3.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Gap Pattern Id		1	As specified in 3GPP TS 36.133 section 8.1.2.1.
Neighbour A3-Offset Ofn	dB	-14	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	dB	0	
Filter coefficient		9	L3 filtering is used
DRX		ON	DRX related parameters are defined in Table A.8.3.3.1-3
Time offset between cells		3 ms	Asynchronous cells
T1	S	30	
T2	S	7	

Table A.8.3.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	4	4	24
N_{oc} Note 2	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	4	24
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-74
SCH_RP Note 3	dBm/15 KHz	-94	-94	-94	-74
Propagation Condition		AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.3.3.1-3: DRX-Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting in DRX under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

Field	Value	Comment
onDurationTimer	psf1	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.3.3.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting in DRX under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

A.8.3.3.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 6400 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.4 E-UTRAN TDD - TDD Inter-frequency Measurements

A.8.4.1 E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

A.8.4.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD-TDD inter-frequency cell search requirements in section 8.1.2.3.4.

The test parameters are given in Table A.8.4.1.1-1 and A.8.4.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.4.1.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Gap Pattern Id		1	As specified in 3GPP TS 36.133 section 8.1.2.1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in 3GPP TS 36.211 section 4.2 Table 4.2-2
CP length		Normal	
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	dB	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells		3 μs	Synchronous cells
T1	s	5	
T2	s	10	

Table A.8.4.1.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
SCH_RP Note 4	dBm/15 kHz	-94	-94	-infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.8.4.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.4.2 E-UTRAN TDD-TDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in synchronous cells

A.8.4.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These test will partly verify the TDD-TDD inter-frequency cell search requirements when DRX is used in section 8.1.2.3.

The common test parameters are given in Tables A.8.4.2.1-1 and A.8.4.2.1-2. DRX configuration for Test1 and Test2 are given in Table A.8.4.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.4.2.1-4. In these tests, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time aligmend. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The tests consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.4.2.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Parameter	Unit	Test 1	Test 2	Comment
		Value		
PDSCH parameters		DL Reference Measurement Channel R.0 TDD		As specified in section A.3.1.1.2. Note that UE may only be allocated at *On Duration*
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD		As specified in section A.3.1.2.2.
E-UTRA RF Channel Number		1, 2		Two TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10		
Active cell		Cell 1		Cell 1 is on RF channel number 1
Neighbour cell		Cell 2		Cell 2 is on RF channel number 2
Gap Pattern Id		0		As specified in 3GPP TS 36.133 section 8.1.2.1.
Uplink-downlink configuration		1		As specified in 3GPP TS 36.211 section 4.2 Table 4.2-2
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
A3-Offset	dB	-6		
Hysteresis	dB	0		
CP length		Normal		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
PRACH configuration		4		As specified in table 5.7.1-3 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.4.2.1-3
Time offset between cells		3 μs		Synchronous cells
T1	s	5		
T2	s	5	30	

Table A.8.4.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 kHz	-98			
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table A.8.4.2.1-3: drx-Configuration to be used in E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	sf1	sf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.4.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see section 6.3.2 in 3GPP TS 36.331.
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and 10.1 in 3GPP TS 36.213.

A.8.4.2.2 Test Requirements

In Test1 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 20*1280ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report

A.8.4.3 E-UTRAN TDD-TDD inter-frequency event triggered reporting under AWGN propagation conditions in synchronous cells with DRX when L3 filtering is used

A.8.4.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX when L3 filtering is used. This test will partly verify the TDD-TDD inter-frequency cell search in DRX requirements in section 8.1.2.3.2.2 and the UE behaviour with the filterCoefficent defined in [2].

The test parameters are given in Tables A.8.4.3.1-1, A.8.4.3.1-2, A.8.4.3.1-3 and A.8.4.3.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 and the filter coefficient is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 1 as defined in Table 8.1.2.1-1 is provided.

The uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.4.3.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Time offset between cells	μs	3	synchronous cells
Gap Pattern Id		1	As specified in 3GPP TS 36.133 section 8.1.2.1.
Uplink-downlink configuration of cells		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cells		6	As specified in table 4.2.1 in TS 36.211
Neighbour A3-Offset Ofn	dB	-14	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		9	L3 filtering is used
DRX		ON	DRX related parameters are defined in Table A.8.4.3.1-3
T1	s	30	
T2	s	7	

Table A.8.4.3.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	4	4	24
N_{oc} Note 2	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	4	24
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-74
SCH_RP Note 3	dBm/15 KHz	-94	-94	-94	-74
Propagation Condition		AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.4.3.1-3: DRX-Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting in DRX under AWGN propagation conditions with DRX when L3 filtering is used

Field	Value	Comment
onDurationTimer	psf1	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.4.3.1-4: TimeAlignmentTimer -Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting in DRX under AWGN propagation conditions with DRX when L3 filtering is used

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

A.8.4.3.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 6400 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report

A.8.5 E-UTRAN FDD - UTRAN FDD Measurements

A.8.5.1 E-UTRAN FDD - UTRAN FDD event triggered reporting under fading propagation conditions

A.8.5.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN FDD- UTRAN FDD cell search requirements in section 8.1.2.4.1.

The test parameters are given in Tables A.8.5.1.1-1, A.8.5.1.1-2 and A.8.5.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.5.1.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1.
Gap Pattern Id		1	As specified in 3GPP TS 36.133 section 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
b1-Threshold-UTRA	dB	-18	CPICH Ec/Io threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
T1	s	5	
T2	s	6	

Table A.8.5.1.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.5.1.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-14
Propagation Condition		Case 5 (Note 3)	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.			

A.8.5.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.5.2 E-UTRAN FDD - UTRAN FDD SON ANR cell search reporting under AWGN propagation conditions

A.8.5.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of the strongest UTRAN cell for SON automatic neighbour relations. This test will partly verify the E-UTRAN FDD - UTRAN FDD cell search requirements for identification of a new UTRA FDD cell for SON given in section 8.1.2.4.7.1.

The test parameters are given in Tables A.8.5.2.1-1, A.8.5.2.1-2 and A.8.5.2.1-3 below. In the measurement control information it is indicated to the UE that periodical reporting with the purpose 'reportStrongestCellsForSON' is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. Prior to the start of time period T1, an interRATperiodic measurement reporting configuration with purpose reportStrongestCellsForSON is configured, and linked to a UTRA measurement object corresponding to channel UARFCN 1. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.5.2.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD cell search reporting for SON ANR in AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1.
Gap Pattern Id		1	As specified in 3GPP TS 36.133 section 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		None	No explicit neighbour list is provided to the UE
T1	s	>5	During T1, cell 2 shall be powered off, and during the off time the primary scrambling code shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2	s	6	

Table A.8.5.2.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for UTRAN FDD cell search for SON ANR under AWGN propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA [Note 1]	dB		
OCNG_RB [Note 1]	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} [Note 3]	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP [Note 4]	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.5.2.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for UTRAN FDD cell search for SON ANR under AWGN propagation conditions

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-3.35
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-15
Propagation Condition		AWGN	

Note 1: The DPCH level is controlled by the power control loop.
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.

A.8.5.2.2 Test Requirements

The UE shall send the first measurement report containing the primary scrambling code of cell 2, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The rate of correct measurement reports observed with this delay during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.5.3 E-UTRAN FDD-UTRAN FDD event triggered reporting when DRX is used under fading propagation conditions

A.8.5.3.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the E-UTRAN FDD-UTRAN FDD cell search requirements when DRX is used in section 8.1.2.4.1.2.

In these tests, there are two cells, one E-UTRAN cell and one UTRAN cell, and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

The common test parameters are given in Table A.8.5.3.1-1. Cell specific test parameters are given in Table A.8.5.3.1-2 for E-UTRAN and in Table A.8.5.3.1-5 for UTRAN. DRX configuration for Test1 and Test2 are given in Table A.8.5.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.5.2.1-4.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.5.3.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD event triggered reporting when DRX is used in fading propagation conditions

Parameter	Unit	Test 1	Test 2	Comment
		Value		
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD		As specified in section A.3.1.1.1 Note that UE may only be allocated at *On Duration*
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD		As specified in section A.3.1.2.1.
Gap Pattern Id		0		As specified in 3GPP TS 36.133 section 8.1.2.1.
Active cell		Cell 1		Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2		Cell 2 is on UTRA RF channel number 1.
CP length		Normal		Applicable to cell 1
E-UTRA RF Channel Number		1		One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10		
UTRA RF Channel Number		1		One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io		
b1-Threshold-UTRA	dB	-18		CPICH Ec/Io threshold for event B1.
Hysteresis	dB	0		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
PRACH configuration		4		As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.5.3.1-3
Monitored UTRA FDD cell list size		12		UTRA cells on UTRA RF channel 1 provided in the cell list.
T1	s	5		
T2	s	6	30	

Table A.8.5.3.1-2: Cell specific test parameters for E-UTRAN FDD (cell #1) event triggered reporting of UTRAN FDD cell when DRX is used under fading propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
$\hat{E}_s/N_{oc}$	dB	4	4
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.8.5.3.1-3: drx-Configuration to be used in E-UTRAN FDD-UTRAN FDD event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	sf1	sf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	Disable	Disable	
Note: For further information see section 6.3.2 in 3GPP TS 36.331.			

Table A.8.5.3.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN FDD-UTRAN FDD event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see section 6.3.2 in 3GPP TS 36.331.
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

Table A.8.5.3.1-5: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell when DRX is used under fading propagation conditions

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-14
Propagation Condition		Case 5 (Note 3)	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.			

A.8.5.3.2 Test Requirements

In Test1 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 2400 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE sends the measurement report on PUSCH.

In Test2 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 20*1280ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event B1 measurement report

A.8.6 E-UTRAN TDD - UTRAN FDD Measurements

A.8.6.1 E-UTRAN TDD - UTRAN FDD event triggered reporting under fading propagation conditions

A.8.6.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN TDD- UTRAN FDD cell search requirements in section 8.1.2.4.2.

The test parameters are given in Tables A.8.6.1.1-1, A.8.6.1.1-2 and A.8.6.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.6.1.1-1: General test parameters for E-UTRAN TDD-UTRAN FDD event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2.
Gap Pattern Id		1	As specified in 3GPP TS 36.133 section 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Special subframe configuration		6	As specified in table 4.2-1 in 3GPP TS 36.211. Applicable to cell 1.
Uplink-downlink configuration		1	As specified in table 4.2-2 in 3GPP TS 36.211. Applicable to cell 1.
CP length		Normal	Applicable to cell 1.
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
b1-Threshold-UTRA	dB	-18	CPICH Ec/Io threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
T1	s	5	
T2	s	6	

Table A.8.6.1.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.6.1.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-14
Propagation Condition		Case 5 (Note 3)	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.			

A.8.6.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.7 E-UTRAN TDD – UTRAN TDD Measurements

A.8.7.1 E-UTRAN TDD to UTRAN TDD cell search under fading propagation conditions

A.8.7.1.1 Test Purpose and Environment

A.8.7.1.1.1 3.84 Mcps TDD option

A.8.7.1.1.2 1.28 Mcps TDD option

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRA TDD to UTRA TDD cell search requirements in section 8.1.2.4.3 under fading propagation conditions.

This test scenario comprised of 1 E-UTRA TDD serving cell, and 1 UTRA TDD cell to be searched. Test parameters are given in Table A.8.7.1.1.2-1, A.8.7.1.1.2-2, and A.8.7.1.1.2-3. Gap pattern configuration #0 as defined in table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.7.1.1.2-1: General test parameters for E-UTRA TDD to UTRA(1.28 Mcps TDD OPTION) cell search in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Active cell		Cell 1	E-UTRA TDD cell
Neighbour cell		Cell 2	UTRA 1.28Mcps TDD Cell
Gap Pattern Id		0	As specified in 3GPP TS 36.133 section 8.1.2.1.
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
CP length of cell 1		normal	
Hysteresis	dB	0	
TimeToTrigger	dB	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells		3 ms	Asynchronous cells
Ofn	dB	0	
Hys	dB	0	
Thresh	dBm	-87	
T1	s	5	
T2	s	10	

Table A.8.7.1.1.2-2: Cell specific test parameters for cell search E-UTRA TDD to UTRA TDD test case (cell 1)

Parameter	Unit	Cell 1	
		T1	**T2**
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RB	dB		
SSS_RB	dB		
PCFICH_PA	dB		
PHICH_PA	dB		
PHICH_PB	dB		
PDCCH_PA	dB		
PDCCH_PB	dB		
PDSCH_PA	dB		
PDSCH_PB	dB		
OCNG_RA Note1	dB		
OCNG_RB Note1	dB		
$\hat{E}_s/I_{ot}$	dB	9	9
$\hat{E}_s/N_{oc}$	dB	9	9
N_{oc}	dBm/15kHz	-98	
RSRP	dBm/15kHz	-89	-89
SCH_RP	dBm/15kHz	-89	-89
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.7.1.1.2-3: Cell specific test parameters for cell search E-UTRA TDD to UTRA TDD test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number NOTE1		Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior NOTE2	dB	-3	-3		
$\hat{I}_{or}/I_{oc}$	dB	-inf	5	-inf	5
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-inf	-78	n.a.	n.a.
Propagation Condition		Case 3 NOTE3			
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: Case 3 propagation conditions are defined in Annex B of 3GPP TS 25.102					

A.8.7.1.1.3 7.68 Mcps TDD option

A.8.7.1.2 Test Requirements

A.8.7.1.2.1 3.84 Mcps TDD option

A.8.7.1.2.2 1.28 Mcps TDD option

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 6400 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.7.1.2.3 7.68 Mcps TDD option

A.8.7.2 E-UTRAN TDD-UTRAN TDD cell search when DRX is used under fading propagation conditions

A.8.7.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the E-UTRAN TDD to UTRAN TDD inter-RAT cell search requirements when DRX is used in section 8.1.2.4.3.2 under fading propagation conditions.

The common test parameters are given in Tables A.8.7.2.1-1, A.8.7.2.1-2 and A.8.7.2.1-3. DRX configuration for Test1 and Test2 are given in Table A.8.7.2.1-4 and time alignment timer and scheduling request related parameters in Table A.8.7.2.1-5. In these tests, there are two cells, 1 E-UTRAN TDD serving cell and 1 UTRAN TDD cell to be searched, Gap pattern configuration # 0 as defined in table 8.1.2.1-1 is provided.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time aligmend. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.7.2.1-1: General test parameters for E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions

Parameter	Unit	Test 1	Test 2	Comment
		Value		

PDSCH parameters		DL Reference Measurement Channel R.0 TDD		As specified in section A.3.1.1.2. Note that UE may only be allocated at On Duration
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD		As specified in section A.3.1.2.2.
Active cell		Cell 1		E-UTRAN TDD cell
Neighbour cell		Cell 2		UTRAN 1.28Mcps TDD cell
Gap Pattern Id		0		As specified in 3GPP TS 36.133 section 8.1.2.1.
Uplink-downlink configuration		1		As specified in 3GPP TS 36.211 section 4.2 Table 4.2-2
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
PRACH configuration		53		As specified in table 5.7.1-3 in 3GPP TS 36.211
CP length of cell 1		Normal		
Ofn	dB	0		
Hys	dB	0		
Thresh	dBm	-83		Absolute P-CCPCH RSCP threshold for event B1
Hysteresis	dB	0		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.4.2.1-3
Time offset between cells		3 ms		Asynchronous cells
T1	s	5		
T2	s	8	30	

Table A.8.7.2.1-2: Cell specific test parameters for E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions(cell 1)

Parameter	Unit	Cell 1	
		T1	**T2**
E-UTRA RF Channel Number		1	
BWchannel	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RB	dB		
SSS_RB	dB		
PCFICH_PA	dB		
PHICH_PA	dB		
PHICH_PB	dB		
PDCCH_PA	dB		
PDCCH_PB	dB		
PDSCH_PA	dB		
PDSCH_PB	dB		
OCNG_RANote1	dB		
OCNG_RBNote1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc} Note 2	dBm/15kHz	-98	
RSRP Note 3	dBm/15kHz	-94	-94
SCH_RP Note 3	dBm/15kHz	-94	-94
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.8.7.2.1-3: Cell specific test parameters for E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions(cell 2)

Parameter	Unit	Cell 2 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number NOTE1		Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior NOTE2	dB	-3	-3		
$\hat{I}_{or}/I_{oc}$	dB	-inf	9	-inf	9
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-inf	-74	n.a.	n.a.
Propagation Condition		Case 3 NOTE3			
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior. Note 3: Case 3 propagation conditions are defined in Annex B of 3GPP TS 25.102					

Table A.8.7.2.1-4: drx-Configuration to be used in E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	sf1	pf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.7.2.1-5: TimeAlignmentTimer and sr-ConfigIndex -Configuration to be used in E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see section 6.3.2 in 3GPP TS 36.331.
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and 10.1 in 3GPP TS 36.213.

A.8.7.2.2 Test Requirements

In Test1 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 6400ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 25.6s from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event B1 measurement report

A.8.7.3 E-UTRAN TDD - UTRAN TDD SON ANR cell search reporting in AWGN propagation conditions

A.8.7.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of the strongest UTRAN TDD cell for SON automatic neighbour relations. This test will partly verify the E-UTRAN TDD - UTRAN TDD cell search requirements for identification of a new UTRA TDD cell for SON given in section 8.1.2.4.13.

In the measurement control information it is indicated to the UE that periodical reporting with the purpose 'reportStrongestCellsForSON' is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. Prior to the start of time period T1, an interRATperiodic measurement reporting configuration with purpose reportStrongestCellsForSON is configured, and linked to a UTRA measurement object corresponding to channel UARFCN 1. During time duration T1, the UE shall not have any timing information of cell 2.

A.8.7.3.2 Test Parameters

The test parameters are given in Tables A.8.7.3.1-1, A.8.7.3.1-2 and A.8.7.3.1-3.

Table A.8.7.3.1-1: General test parameters for E-UTRAN TDD-UTRAN TDD cell search reporting for SON ANR in AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Gap Pattern Id		1	As specified in 3GPP TS 36.133 section 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
Inter-RAT (UTRA TDD) measurement quantity		P-CCPCH RSCP	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		None	No explicit neighbour list is provided to the UE
T1	s	>5	During T1, cell 2 shall be powered off, and during the off time the primary scrambling code shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2	s	14	

Table A.8.7.3.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for UTRAN TDD cell search for SON ANR under AWGN propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.7.3.1-3: Cell specific test parameters for UTRAN TDD (cell # 2) for UTRAN TDD cell search for SON ANR under AWGN propagation conditions

Parameter	Unit	Cell 2			
		T1		T2	
UTRA RF Channel number Note2		Channel 2			
DL timeslot number		0	DwPTS	0	DwPTS
PCCPCH_Ec/Ior	dB	-3		-3	
DwPCH_Ec/Ior	dB		0		0
OCNS_Ec/Ior	dB	-3		-3	
Îor/Ioc	dB	-Infinity		5	
PCCPCH RSCP Note1	dBm	-Infinity	n.a.	-73	n.a.
Io Note1	dBm/1.28MHz	-Infinity		-70.88	
Ioc	dBm/1.28MHz	-75			
Propagation condition		AWGN			

Note 1: PCCPCH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.
Note 2: In the case of multi-frequency network of 1.28 Mcps TDD, the UTRA RF Channel Number can be set for the primary frequency in this test.

A.8.7.3.3 Test Requirements

The UE shall send the first measurement report containing the physical cell identity of cell 2, with a measurement reporting delay less than 12800 ms from the beginning of time period T2.

The rate of correct measurement reports observed with this delay during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.8 E-UTRAN FDD – GSM Measurements

A.8.8.1 E-UTRAN FDD – GSM event triggered reporting in AWGN

A.8.8.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter-RAT (GSM) measurements. This test will partly verify the E-UTRAN FDD - GSM cell search requirements in section 8.1.2.4.5.

The test parameters are given in Tables A.8.8.1.1-1, A.8.8.1.1-2 and A.8.8.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.8.1.1-1: General test parameters for E-UTRAN FDD-GSM event triggered reporting in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1.
Gap Pattern Id		0	As specified in 3GPP TS 36.133 section 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI	
b1-Threshold-GERAN	dBm	-80	GSM Carrier RSSI threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbours including ARFCN 1	List of GSM cells provided before T2 starts.
T1	s	5	
T2	s	5	

Table A.8.8.1.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for event triggered reporting of GSM cell in AWGN

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.8.1.1-3: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		ARFNC 1	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

A.8.8.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report including BSIC of cell # 2, with a measurement reporting delay less than 3120 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

NOTE 2: The delay for GSM cell identification with BSIC verified is equal to 3120 ms, which is the sum of the event triggered measurement reporting delay and the initial BSIC identification delay.

The event triggered measurement reporting delay = $2*T_{Measurement\ Period,\ GSM}$ = 2* 480ms =960ms.

Initial BSIC identification delay = 2160 ms.

A.8.8.2 E-UTRAN FDD-GSM event triggered reporting when DRX is used in AWGN

A.8.8.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the E-UTRAN FDD-GSM cell search requirements when DRX is used in section 8.1.2.4.5.2.

In these tests, there are two cells, one E-UTRAN cell and one GSM cell, and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

The common test parameters are given in Table A.8.8.2.1-1. Cell specific test parameters are given in Table A.8.8.2.1-2 for E-UTRAN and in Table A.8.8.2.1-5 for GSM. DRX configuration for Test1 and Test2 are given in Table A.8.8.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.8.2.1-4.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.8.2.1-1: General test parameters for E-UTRAN FDD-GSM event triggered reporting when DRX is used in AWGN

Parameter	Unit	Test 1	Test 2	Comment
		Value		
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD		As specified in section A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD		As specified in section A.3.1.2.1.
Gap Pattern Id		0		As specified in 3GPP TS 36.133 section 8.1.2.1.
Active cell		Cell 1		Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2		Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal		Applicable to cell 1
E-UTRA RF Channel Number		1		One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10		
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI		
B1-Threshold-GERAN	dBm	-80		GSM Carrier RSSI threshold for event B1.
Hysteresis	dB	0		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
PRACH configuration		4		As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.8.2.1-3
Monitored GSM cell list size		6 GSM neighbours including ARFCN 1		List of GSM cells provided before T2 starts.
T1	s	5		
T2	s	5	45	

Table A.8.8.2.1-2: Cell specific test parameters for E-UTRAN FDD (cell #1) event triggered reporting of GSM cell when DRX is used in AWGN

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
$\hat{E}_s/N_{oc}$	dB	4	4
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.8.8.2.1-3: drx-Configuration to be used in E-UTRAN FDD-GSM event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	sf1	sf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	Disable	Disable	
Note: For further information see section 6.3.2 in 3GPP TS 36.331.			

Table A.8.8.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN FDD-GSM event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see section 6.3.2 in 3GPP TS 36.331.
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section 10.1 in 3GPP TS 36.213.

Table A.8.8.2.1-5: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell when DRX is used in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		ARFNC 1	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

A.8.8.2.2 Test Requirements

In Test1 the UE shall send one Event B1 triggered measurement report including BSIC of cell # 2, with a measurement reporting delay less than 3120 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 42.8 seconds from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event B1 measurement report

A.8.9 E-UTRAN FDD - UTRAN TDD measurements

A.8.9.1 E-UTRAN FDD - UTRAN TDD event triggered reporting in fading propagation conditions

A.8.9.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. The test will partly verify the E-UTRAN FDD - UTRAN TDD cell search requirements in section 8.1.2.4.4 in fading environment.

The test parameters are given in Table A.8.9.1.1-1, A.8.9.1.1-2 and A.8.9.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.9.1.1-1: General test parameters for Event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel TBD	As specified in TS 36.101 section TBD
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Active cell		Cell 1	E-UTRA FDD Cell 1
Neighbour cell		Cell 2	UTRA TDD Cell 2 is to be identified.
Gap Pattern Id		1	As specified in TS 36.133 section 8.1.2.1. Measurement Gap Repetition Period = 80ms
Inter-RAT measurement quantity		UTRA TDD PCCPCH RSCP	
Threshold other system	dBm	-75	UTRA TDD PCCPCH RSCP threshold for event B1.
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	dB	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
T1	s	5	
T2	s	15	

Table A.8.9.1.1-2: Cell specific test parameters for Event triggered reporting of UTRA TDD neighbours in fading propagation conditions (cell1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc}	dBm/15KHz	-98	
RSRP	dBm	-94	-94
$\hat{E}_s/I_{ot}$	dB	4	4
P-SCH_RP	dBm	-94	
S-SCH_RP	dBm	-94	
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.9.1.1-3: Cell specific test parameters for Event triggered reporting of UTRA TDD neighbours in fading propagation conditions (cell2)

Parameter	Unit	Cell 2			
		T1		T2	
Timeslot Number		0	DwPTS	0	DwPTS
UTRA RF Channel Number (NOTE1)		Channel1			
PCCPCH_Ec/Ior	dB	-Infinity		-3	
DwPCH_Ec/Ior	dB	-Infinity			0
OCNS_Ec/Ior		-Infinity		-3	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity		9	
I_{oc}	dBm/1.28 MHz	-70			
PCCPCH_RSCP [Note 3]	dB	-Infinity		-64	
Io [Note 3]	dBm/1.28 MHz	-70.00		-60.49	
Propagation Condition		Case 3 (NOTE2)			
NOTE1: The DPCH of the cell is located in a timeslot other than 0. NOTE2: Case 3 propagation conditions are specified in TS25.102 Annex B NOTE3: PCCPCH_RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.8.9.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 12800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to [2] x TTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.10 E-UTRAN TDD – GSM Measurements

A.8.10.1 E-UTRAN TDD – GSM event triggered reporting in AWGN

A.8.10.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter-RAT (GSM) measurements. This test will partly verify the E-UTRAN TDD - GSM cell search requirements in section 8.1.2.4.6.

The test parameters are given in Tables A.8.10.1.1-1, A.8.8.1.1-2 and A.8.10.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.10.1.1-1: General test parameters for E-UTRAN TDD-GSM event triggered reporting in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2.
Gap Pattern Id		0	As specified in 3GPP TS 36.133 section 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
Special subframe configuration		6	As specified in table 4.2-1 in 3GPP TS 36.211
Uplink-downlink configuration		1	As specified in table 4.2-2 in 3GPP TS 36.211
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI	
b1-Threshold-GERAN	dBm	-80	GSM Carrier RSSI threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbours including ARFCN 1	List of GSM cells provided before T2 starts.
T1	s	5	
T2	s	5	

Table A.8.10.1.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for event triggered reporting of GSM cell in AWGN

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.10.1.1-3: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		ARFNC 1	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

A.8.10.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report including the valid BSIC of cell # 2, with a measurement reporting delay less than 3120 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

NOTE 2: The delay for GSM cell identification with BSIC verified is equal to 3120 ms, which is the sum of the event triggered measurement reporting delay and the initial BSIC identification delay.

The event triggered measurement reporting delay = 2*$T_{\text{Measurement Period, GSM}}$ = 2* 480ms =960ms.

Initial BSIC identification delay = 2160 ms.

A.8.10.2 E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

A.8.10.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the E-UTRAN TDD-GSM cell search requirements when DRX is used in section 8.1.2.4.6.

In these tests, there are two cells, one E-UTRAN cell and one GSM cell, and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

The common test parameters are given in Table A.8.10.2.1-1. Cell specific test parameters are given in Table A.8.10.2.1-2 for E-UTRAN and in Table A.8.10.2.1-5 for GSM. DRX configuration for Test1 and Test2 are given in Table A.8.10.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.10.2.1-4.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.10.2.1-1: General test parameters for E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Parameter	Unit	Test 1	Test 2	Comment
		Value		
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD		As specified in section A.3.1.1.2. Note that UE may only be allocated at *On Duration*
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD		As specified in section A.3.1.2.2.
Gap Pattern Id		0		As specified in 3GPP TS 36.133 section 8.1.2.1.
Active cell		Cell 1		Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2		Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211.
Uplink-downlink configuration		1		As specified in 3GPP TS 36.211 section 4.2 Table 4.2-2
CP length		Normal		Applicable to cell 1
E-UTRA RF Channel Number		1		One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10		
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI		
B1-Threshold-GERAN	dBm	-80		GSM Carrier RSSI threshold for event B1.
Hysteresis	dB	0		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
PRACH configuration		4		As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.10.2.1-3
Monitored GSM cell list size		6 GSM neighbours including ARFCN 1		List of GSM cells provided before T2 starts.
T1	s	5		
T2	s	5	45	

Table A.8.10.2.1-2: Cell specific test parameters for E-UTRAN TDD (cell #1) event triggered reporting of GSM cell when DRX is used in AWGN

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
$\hat{E}_s/N_{oc}$	dB	4	4
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.10.2.1-3: drx-Configuration to be used in E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	sf1	sf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	Disable	Disable	

Note: For further information see section 6.3.2 in 3GPP TS 36.331.

Table A.8.10.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see section 6.3.2 in 3GPP TS 36.331.
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section 10.1 in 3GPP TS 36.213.

Table A.8.10.2.1-5: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell when DRX is used in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		ARFNC 1	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

A.8.10.2.2 Test Requirements

In Test1 the UE shall send one Event B1 triggered measurement report including BSIC of cell # 2, with a measurement reporting delay less than 3120 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 42.8 seconds from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event B1 measurement report

A. 8.11 Monitoring of Multiple Layers

A. 8.11.1 Multiple E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions

A. 8.11.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of multiple events. This test will partly verify the FDD-FDD inter-frequency cell search requirements in section 8.1.2.3.

The test parameters are given in Tables A.8.11.1.1.1-1 and A.8.11.1.1.1-2. In this test, there are three cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2 or cell 3.

Table A. 8.11.1.1-1: General test parameters for Inter-frequency E-UTRA FDD – E-UTRA FDD and E-UTRA FDD cell search under fading

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
E-UTRA RF Channel Number		1, 2, 3	Three FDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2 and cell 3	Cell 2 is on RF channel number 2 and cell 3 is on RF channel number 3
Gap Pattern Id		0	As specified in 3GPP TS 36.133 section 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between E-UTRAN FDD cells		3 ms	Asynchronous cells
T1	s	5	
T2	s	10	

Table A. 8.11.1.1-2: Cell specific test parameters for Inter-frequency E-UTRA FDD – E-UTRA FDD and E-UTRA FDD cell search under fading

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		2		3	
$BW_{channel}$	MHz	10		10		10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD		OP.2 FDD	
PBCH_RA	dB	0		0		0	
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 3	dBm/15 kHz	-98					
RSRP Note 4	dBm/15 kHz	-98	-98	-Infinity	-95	-Infinity	-95
$\hat{E}_s/I_{ot}$	dB	0	0	-Infinity	3	-Infinity	3
SCH_RP Note 4	dBm/15 kHz	-98	-98	-Infinity	-95	-Infinity	-95
$\hat{E}_s/N_{oc}$	dB	0	0	-Infinity	3	-Infinity	3
Propagation Condition		AWGN		ETU70		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A. 8.11.1.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for both cell 2 and cell 3, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.11.2 E-UTRAN TDD – E-UTRAN TDD and E-UTRAN TDD Inter-frequency event triggered reporting under fading propagation conditions

A.8.11.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of two events. This test will partly verify the TDD-TDD inter-frequency cell search requirements in section 8.1.2.3.

The test parameters are given in Tables A.8.11.2.1-1 and A.8.11.2.1-2. In this test, there are three cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2 and cell 3.

Table A.8.11.2.1-1: General test parameters for E-UTRAN TDD - E-UTRAN TDD and E-UTRAN TDD Inter-frequency event triggered reporting under fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in 3GPP TS 36.211 section 4.2 Table 4.2-2
E-UTRA RF Channel Number		1, 2, 3	Three TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbor cells		Cell 2 and Cell 3	Cell 2 and 3 are on RF channel numbers 2 and 3 respectively
Gap Pattern Id		0	As specified in 3GPP TS 36.133 section 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between cells		3 μs	Synchronous cells
T1	s	5	
T2	s	10	

Table A.8.11.2.1-2: Cell specific test parameters for E-UTRAN TDD - E-UTRAN TDD and E-UTRAN TDD Inter-frequency event triggered reporting under fading propagation conditions cells

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		2		3	
$BW_{channel}$	MHz	10		10		10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD		OP.2 TDD	
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB	0		0		0	
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 3	dBm/15 kHz	-98					
RSRP Note 4	dBm/15 kHz	-98	-98	-inf	-95	-inf	-95
$\hat{E}_s/I_{ot}$	dB	0	0	-inf	3	-inf	3
SCH_RP Note 4	dBm/15 kHz	-98	-98	-inf	-95	-inf	-95
$\hat{E}_s/N_{oc}$	dB	0	0	-inf	3	-inf	3
Propagation Condition		AWGN		ETU70		ETU70	

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.11.2.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for cell 2 with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall send one Event A3 triggered measurement report for cell 3 with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement repor

A.8.11.3 E-UTRAN FDD-FDD Inter-frequency and UTRAN FDD event triggered reporting under fading propagation conditions

A.8.11.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency and UTRAN FDD measurements. This test will partly verify the FDD-FDD inter-frequency cell search requirements in section 8.1.2.3 and the E-UTRAN FDD- UTRAN FDD cell search requirements in section 8.1.2.4.1.

The test parameters are given in Tables A.8.11.3.1-1, A.8.11.3.1-2 and A.8.11.3.1-3. In this test, there are two cells on different carrier frequencies and one cell on UTRAN carrier frequency and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 and B2 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2 and cell 3.

Table A.8.11.3.1-1: General test parameters for Combined inter-frequency and UTRAN event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1.
Gap Pattern Id		0	As specified in 3GPP TS 36.133 section 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cells		Cell 2, 3	Cell 2 is on E-UTRA RF channel number 2. Cell 3 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
E-UTRAN FDD measurement quantity		RSRP	
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/N0	
A3-Offset	dB	-6	
b2-Threshold-E-UTRA	dB	-86	RSRP threshold for event B2.
b2-Threshold-UTRA	dB	-18	CPICH Ec/N0 threshold for event B2.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
Time offset between cells		3 ms	Asynchronous cells
T1	s	5	
T2	s	8	

Table A.8.11.3.1-2: Cell specific test parameters for Combined inter-frequency and UTRAN event triggered reporting in fading propagation conditions

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		AWGN		ETU70	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.11.3.1-3: Cell specific test parameters for UTRAN FDD (cell # 3) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 3	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-14
Propagation Condition		Case 5 (Note 3)	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.			

A.8.11.3.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.11.4 InterRAT E-UTRA TDD to E-UTRA TDD and UTRA TDD cell search test case

A.8.11.4.1 Test Purpose and Environment

This test is to verify that the UE makes correct reporting of an event when doing inter frequency measurements and UTRA TDD measurements. The test will partly verify the requirements in section 8.1.2.3.2 combined 8.1.2.4.3 under fading propagation conditions.

This test scenario comprised of 2 E-UTRA TDD cells operating on different frequency, and 1 UTRA TDD cell. Test parameters are given in table A.8.11.4.1-1, A.8.11.4.1-2, and A.8.11.4.1-3. Gap pattern configuration #0 as defined in section 8.1.2.1 is provided.

The test consists of 2 successive time periods, with time duration T1 and T2. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 and B2 shall be used.

Table A.8.11.4.1-1: General test parameters for combined E-UTRA TDD inter-frequency and UTRA TDD cells search under fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Active cell		Cell 1	E-UTRA TDD cell is on RF channel number 1
Neighbour cell		Cell 2	E-UTRA TDD cell is on RF channel number 2
		Cell 3	1.28Mcps TDD cell
CP length of cell1 and cell2		Normal	
Uplink-downlink configuration of cell1 and cell2		1	As specified in Table 4.2-2 in TS 36.211. The same configuration in both cells
Special subframe configuration of cell1 and cell2		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Gap Pattern Id		0	As specified in 3GPP TS 36.133 section 8.1.2.1.
E-UTRAN TDD measurement quantity		RSRP	
UTRAN TDD measurement quantity		RSCP	
DRX		OFF	
Ofn	dB	0	Parameter for A3 and B2 event
Ocn	dB	0	Parameter for A3 event
Hys	dB	0	Parameter for A3 and B2 event
Ofs	dB	0	Parameter for A3 event
Ocs	dB	0	Parameter for A3 event
A3-Offset	dB	-6	Parameter for A3 event
Thresh1	dBm	-86	Absolute E-UTRAN RSRP threshold for event B2
Thresh2	dBm	-84	Absolute UTRAN RSCP threshold for event B2
Hysteresis	dB	0	
TimeToTrigger	dB	0	
Filter coefficient		0	L3 filtering is not used
T1	s	>5	During T1, cell 2 and cell 3 shall be powered off. During the off time the physical layer cell identity of cell 2 shall be changed, and the primary scrambling code of cell 3 shall be changed.
T2	s	15	

Table A.8.11.4.1-2: Cell specific test parameters for combined E-UTRAN TDD inter-frequency and UTRA TDD cell search under fading propagation conditions(cell1 and cell2)

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
BWchannel	MHz	10		10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RANote 1	dB				
OCNG_RBNote 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
N_{oc}	dBm/15 kHz	-98			
RSRP	dBm/15 kHz	-94	-94	-Infinity	-91
SCH_RP	dBm/15 kHz	-94	-94	-infinity	-91
Propagation Condition		AWGN		ETU70	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.11.4.1-3: Cell specific test parameters for combined E-UTRA TDD inter-frequency and UTRA TDD cell search under fading propagation conditions(cell3)

Parameter	Unit	Cell 3 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number*		Channel 3			
PCCPCH_Ec/Ior	dB	-3			
DwPCH_Ec/Ior	dB			0	
OCNS_Ec/Ior	dB	-3			
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	9	-Infinity	9
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-Infinity	-74	n.a.	
Propagation Condition		Case 3			

Note1: The DPCH of all cells are located in a timeslot other than 0.
Note2: In the case of multi-frequency network, the UTRA RF Channel Number can be set for the primary frequency in this test.
Note3: P-CCPCH RSCP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.11.4.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7680ms from the beginning of time period T2.

The UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than 12.8s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.9 Measurement Performance Requirements

Unless explicitly stated otherwise:

- Reported measurements shall be within defined range of accuracy limits defined in Section 9 for 90 % of the reported cases.
- Cell 1 is the serving cell.
- Measurements are performed in RRC_CONNECTED state.
- The reference channels assume transmission of PDSCH with a maximum number of 5 HARQ transmissions unless otherwise specified.

A.9.1 RSRP

A.9.1.1 FDD Intra frequency case

A.9.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.2 for FDD intra frequency measurements.

A.9.1.1.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.1.2-1. In all test cases, Cell 1 is the serving cell and Cell 2 the target cell.

Table A.9.1.1.2-1: RSRP\ FDD Intra frequency test parameters

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-	R.0 FDD	-	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0	0	0	0
N_{oc} Note2	Bands 1, 4, 6, 10 and 11	dBm/15 kHz	-106	-106	-88	-88	-116	
	Bands 2, 5 and 7						-114	
	Bands 3, 8, 12, 13, 14 and 17						-113	
	Band 9						-115	
$\hat{E}_s/I_{ot}$		dB	2.5	-6	2.5	-6	0.46	-5.76
RSRP Note3	Bands 1, 4, 6, 10 and 11	dBm/15 kHz	-100	-105	-82	-87	-113	-117
	Bands 2, 5 and 7						-111	-115
	Bands 3, 8, 12, 13, 14 and 17						-110	-114
	Band 9						-112	-116
Io Note3	Bands 1, 4, 6, 10 and 11.	dBm/9 MHz	-70.27	-70.27	-52.27	-52.27	-82.43	
	Bands 2, 5 and 7						-80.43	
	Bands 3, 8, 12, 13, 14 and 17						-79.43	
	Band 9						-81.43	
$\hat{E}_s/N_{oc}$		dB	6	1	6	1	3	-1
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.1.1.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in section 9.1.2.

A.9.1.2 TDD Intra frequency case

A.9.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.2 for TDD intra frequency measurements.

A.9.1.2.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.2.2-1. In all test cases, Cell 1 is the serving cell and Cell 2 the target cell.

Table A.9.1.2.2-1: RSRP TDD Intra frequency test parameters

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Special subframe configuration[Note1]			6		6		6	
Uplink/downlink configuration[Note1]			1		1		1	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note2] OCNG_RB[Note2]		dB	0	0	0	0	0	0
N_{oc} [Note3]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-106	-106	-88	-88	-116	
$\hat{E}_s/I_{ot}$		dB	2.5	-6	2.5	-6	0.5	-5.76
RSRP[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-100	-105	-82	-87	-113	-117
Io[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/9 MHz	-70.27	-70.27	-52.27	-52.27	-82.43	
$\hat{E}_s/N_{oc}$		dB	6	1	6	1	3	-1
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.1.2.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in section 9.1.2.

A.9.1.3 FDD—FDD Inter frequency case

A.9.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.3 for FDD—FDD inter frequency measurements.

A.9.1.3.2 Test parameters

In this set of test cases the cells are on different carrier frequencies. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.3.2-1 In all test cases, Cell 1 is the serving cell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap.

Table A.9.1.3.2-1: RSRP FDD—FDD Inter frequency test parameters

Parameter		Unit	Test 1		Test 2	
			Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2
$BW_{channel}$		MHz	10	10	10	10
Gap Pattern Id			0	-	0	-
Measurement bandwidth		n_{PRB}	22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RANote1 OCNG_RBNote		dB	0	0	0	0
N_{oc} Note2	Bands 1, 4, 6, 10 and 11.	dBm/15 kHz	-88.65	-88.65	-109	-117
	Bands 2, 5 and 7				-107	-115
	Bands 3, 8, 12, 13, 14 and 17				-106	-114
	Band 9				-108	-116
$\hat{E}_s/I_{ot}$		dB	10	10	13	-4
RSRPNote3	Bands 1, 4, 6, 10 and 11.	dBm/15 kHz	-78.65	-78.65	-96	-121
	Bands 2, 5 and 7				-94	-119
	Bands 3, 8, 12, 13, 14 and 17				-93	-118
	Band 9				-95	-120
IoNote3	Bands 1, 4, 6, 10 and 11.	dBm/9 MHz	-50.45	-50.45	-68.01	-87.76
	Bands 2, 5 and 7				-66.01	-85.76
	Bands 3, 8, 12, 13, 14 and 17				-65.01	-84.76
	Band 9				-67.01	-86.76
$\hat{E}_s/N_{oc}$		dB	10	10	13	-4
Propagation condition		-	AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.1.3.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in section 9.1.3.

A.9.1.4 TDD—TDD Inter frequency case

A.9.1.4.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.3 for TDD—TDD inter frequency measurements.

A.9.1.4.2 Test parameters

In this set of test cases the cells are on different carrier frequencies. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.4.2-1. In all test cases, Cell 1 is the serving cell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap.

Table A.9.1.4.2-1: RSRP TDD—TDD Inter frequency test parameters

Parameter		Unit	Test 1		Test 2	
			Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2
$BW_{channel}$		MHz	10	10	10	10
Special subframe configuration[Note1]			6		6	
Uplink-downlink configuration[Note1]			1		1	
Gap Pattern Id			0	-	0	-
Measurement bandwidth		n_{PRB}	22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note2] OCNG_RB[Note2]		dB	0	0	0	0
N_{oc} [Note3]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-88.65	-88.65	-109	-117
$\hat{E}_s/I_{ot}$		dB	10	10	13	-4
RSRP[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40.	dBm/15 kHz	-78.65	-78.65	-96	-121
Io[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/9 MHz	-50.45	-50.45	-68.01	-87.76
$\hat{E}_s/N_{oc}$		dB	10	10	13	-4
Propagation condition		-	AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.1.4.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in section 9.1.3.

A.9.2 RSRQ

A.9.2.1 FDD Intra frequency case

A.9.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.5.

A.9.2.1.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.1.2-1. In all test cases, Cell 1 is the serving cell and Cell 2 the target cell.

Table A.9.2.1.2-1: RSRQ FDD Intra frequency test parameters

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-	R.0 FDD	-	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0	0	0	0
N_{oc} Note2	Bands 1, 4, 6, 10 and 11.	dBm/15 kHz	-84.76	-84.76	-103.85	-103.85	-116	
	Bands 2, 5 and 7						-114	
	Bands 3, 8, 12, 13, 14 and 17						-113	
	Band 9						-115	
$\hat{E}_s/I_{ot}$		dB	-1.76	-1.76	-4.7	-4.7	-5.46	-5.46
RSRP Note3	Bands 1, 4, 6, 10 and 11.	dBm/15 kHz	-81.76	-81.76	-106.75	-106.75	-120	-120
	Bands 2, 5 and 7						-118	-118
	Bands 3, 8, 12, 13, 14 and 17						-117	-117
	Band 9						-119	-119
RSRQ Note3	Bands 1, 4, 6, 10 and 11. Bands 2, 5 and 7 Bands 3, 8, 12, 13, 14 and 17 Band 9	dB	-14.77	-14.77	-16.76	-16.76	-17.33	-17.33
Io Note3	Bands 1, 4, 6, 10 and 11.	dBm/9 MHz	-50	-50	-73	-73	-85.67	
	Bands 2, 5 and 7						-83.67	
	Bands 3, 8, 12, 13, 14 and 17						-82.67	
	Band 9						-84.67	
$\hat{E}_s/N_{oc}$		dB	3	3	-2.9	-2.9	-4	-4
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.2.1.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Section 9.1.5.

A.9.2.2 TDD Intra frequency case

A.9.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.5.

A.9.2.2.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.2.2-1. In all test cases, Cell 1 is the serving cell and Cell 2 the target cell.

Table A.9.2.2.2-1: RSRQ TDD Intra frequency test parameters

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Special subframe configuration[Note1]			6		6		6	
Uplink-downlink configuration[Note1]			1		1		1	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0	0	0	0	0
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB								
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA[Note2]								
OCNG_RB[Note2]								
N_{oc} [Note3]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-84.76	-84.76	-103.85	-103.85	-116	
$\hat{E}_s/I_{ot}$		dB	-1.76	-1.76	-4.7	-4.7	-5.46	-5.46
RSRP[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-81.76	-81.76	-106.75	-106.75	-120	-120
RSRQ[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dB	-14.77	-14.77	-16.76	-16.76	-17.33	-17.33
Io[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/9 MHz	-50	-50	-73	-73	-85.67	
$\hat{E}_s/N_{oc}$		dB	3	3	-2.9	-2.9	-4	-4
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.2.2.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Sections 9.1.5.

A.9.2.3 FDD—FDD Inter frequency case

A.9.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.6.

A.9.2.3.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.3.2-1. In all tests, Cell 1 is the serving cell and Cell 2 the target cell.

Table A.9.2.3.2-1: RSRQ FDD—FDD Inter frequency test parameters

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2	1	2
$BW_{channel}$		MHz	10	10	10	10	10	10
Gap Pattern Id			0	-	0	-	0	-
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-	R.0 FDD	-	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0	0	0	0
N_{oc} Note2	Bands 1, 4, 6, 10, and 11.	dBm/15 kHz	-80	-80	-104.70	-104.70	-119.50	-119.50
	Bands 2, 5 and 7						-117.50	-117.50
	Bands 3, 8, 12, 13, 14 and 17						-116.50	-116.50
	Band 9						-118.50	-118.50
$\hat{E}_s/I_{ot}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
RSRP Note3	Bands 1, 4, 6, 10, and 11.	dBm/15 kHz	-81.75	-81.75	-108.70	-108.70	-123.50	-123.50
	Bands 2, 5 and 7						-121.50	-121.50
	Bands 3, 8, 12, 13, 14 and 17						-120.50	-120.50
	Band 9						-122.50	-122.50
RSRQ Note3	Bands 1, 4, 6, 10, and 11. Bands 2, 5 and 7 Bands 3, 8, 12, 13, 14 and 17 Band 9	dB	-14.76	-14.76	-16.25	-16.25	-16.25	-16.25
Io Note3	Bands 1, 4, 6, 10, and 11.	dBm/9 MHz	-50	-50	-75.46	-75.46	-90.26	-90.26
	Bands 2, 5 and 7						-88.26	-88.26
	Bands 3, 8, 12, 13, 14 and 17						-87.26	-87.26
	Band 9						-89.26	-89.26
$\hat{E}_s/N_{oc}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.2.3.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Section 9.1.6.

A.9.2.4 TDD—TDD Inter frequency case

A.9.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.6.

A.9.2.4.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.4.2-1. In all tests, Cell 1 is the serving cell and Cell 2 the target cell.

Table A 9.2.4.2-1: RSRQ TDD—TDD Inter frequency test parameters

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2	1	2
$BW_{channel}$		MHz	10	10	10	10	10	10
Gap Pattern Id			0	-	0	-	0	-
Special subframe configuration Note1			6		6		6	
Uplink-downlink configuration Note1			1		1		1	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0	0	0	0	0
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB								
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA Note2								
OCNG_RB Note2								
N_{oc} Note3	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-80	-80	-104.70	-104.70	-119.50	-119.50
$\hat{E}_s/I_{ot}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
RSRP Note4	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-81.75	-81.75	-108.70	-108.70	-123.50	-123.50
RSRQ Note4	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dB	-14.76	-14.76	-16.25	-16.25	-16.25	-16.25
Io Note4	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/9 MHz	-50	-50	-75.46	-75.46	-90.26	-90.26
$\hat{E}_s/N_{oc}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.2.4.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Section 9.1.6.

Annex B (informative): Change history:

Change History							
Date	**TSG#**	**TSG Doc.**	**CR**	**Rev**	**Subject**	**Old**	**New**
2007-12	RP#38	RP-071037			Approved version in TSG RAN#38	-	8.0.0
2008-03	RP#39	RP-080123	2		Updates of TS36.133	8.0.0	8.1.0
2008-05	RP#40	RP-080325	3		Updates of TS36.133	8.1.0	8.2.0
2008-09	RP#41	RP-080644	006	1	E-UTRAN TDD intra frequency measurements when DRX is used	8.2.0	8.3.0
2008-09	RP#41	RP-080644	008	1	E-UTRAN TDD - UTRAN TDD measurements	8.2.0	8.3.0
2008-09	RP#41	RP-080644	012		RSRQ reporting Range	8.2.0	8.3.0
2008-09	RP#41	RP-080644	018	1	Interfrequency and UTRA interRAT DRX peformance requirements	8.2.0	8.3.0
2008-09	RP#41	RP-080644	020	1	Additions to UE transmit timing requirements	8.2.0	8.3.0
2008-09	RP#41	RP-080644	043		Received interference power measurement performance requirement	8.2.0	8.3.0
2008-09	RP#41	RP-080644	044		Cell Synchronization requirement for E-UTRA TDD	8.2.0	8.3.0
2008-09	RP#41	RP-080644	047		Power Headroom Requirements	8.2.0	8.3.0
2008-09	RP#41	RP-080644	048		Event Triggering and Reporting Criteria Capability Requirements	8.2.0	8.3.0
2008-09	RP#41	RP-080642	004		Correction of E-UTRAN to UTRAN TDD handover	8.2.0	8.3.0
2008-09	RP#41	RP-080642	016	1	Definition of Symbols	8.2.0	8.3.0
2008-09	RP#41	RP-080642	019	1	Idle mode requirements updates	8.2.0	8.3.0
2008-09	RP#41	RP-080642	021	1	General updates to 36.133	8.2.0	8.3.0
2008-09	RP#41	RP-080642	023	1	Handover requirements for E-UTRAN to cdma200 HRPD/1x	8.2.0	8.3.0
2008-09	RP#41	RP-080642	024		Inter-frequency and inter-RAT measurement requirements for multiple layer monitoring	8.2.0	8.3.0
2008-09	RP#41	RP-080642	025		Side conditions for UE measurement procedures and measurement performance requirements	8.2.0	8.3.0
2008-09	RP#41	RP-080642	026		Correction to cell reselection Requirement from E-UTRAN to HRPD/cdma200 1x	8.2.0	8.3.0
2008-09	RP#41	RP-080642	027		IRAT Measurement requirements in TS 36.133	8.2.0	8.3.0
2008-09	RP#41	RP-080713	022	1	Corrections to Handover requirements	8.2.0	8.3.0
2008-09	RP#41	RP-080713	028		Measurement reporting requirements	8.2.0	8.3.0
2008-09	RP#41	RP-080713	029	2	RRC re-establishment requirements	8.2.0	8.3.0
2008-09	RP#41	RP-080713	032		Correction to UE measurement requirements	8.2.0	8.3.0
2008-09	RP#41	RP-080713	033		Correction for the definition of interruption time	8.2.0	8.3.0
2008-09	RP#41	RP-080713	040	1	Correction to idle mode higher priority search requirements	8.2.0	8.3.0
2008-09	RP#41	RP-080713	045		E-UTRAN TDD inter frequency measurement requirements	8.2.0	8.3.0
2008-09	RP#41	RP-080713	046		Updates of the Measurement procedures in RRC_Connected state from RAN 4#47bis and RAN 4#48	8.2.0	8.3.0
2008-12	RP#42	RP-080919	53		Introduction of 700MHz Bands 12, 14 and 17	8.3.0	8.4.0
2008-12	RP#42	RP-080928	88	1	CR to 36.133 on Radio Link Failure Monitoring	8.3.0	8.4.0
2008-12	RP#42	RP-080929	51		Correction to idle mode requirements	8.3.0	8.4.0
2008-12	RP#42	RP-080929	52		Definition of out of service area	8.3.0	8.4.0
2008-12	RP#42	RP-080929	54		Measurement requirements for UTRAN TDD cells in idle state	8.3.0	8.4.0
2008-12	RP#42	RP-080929	69	2	Correction of Inter-RAT UTRA cell reselection requirement	8.3.0	8.4.0
2008-12	RP#42	RP-080929	55		Correction of E_UTRAN cell measurement requirements in idle state	8.3.0	8.4.0
2008-12	RP#42	RP-080930	76		Correction to HO Requirements	8.3.0	8.4.0
2008-12	RP#42	RP-080931	71		Random access requirements	8.3.0	8.4.0
2008-12	RP#42	RP-080932	85		Cell phase synchronization error for large cell	8.3.0	8.4.0
2008-12	RP#42	RP-080932	63	4	Synchronization Requirements for E-UTRAN to 1xRTT and HRPD Handovers	8.3.0	8.4.0
2008-12	RP#42	RP-080933	49		E-UTRAN TDD-TDD intra/inter frequency measurement reporting requirements	8.3.0	8.4.0
2008-12	RP#42	RP-080933	50		E-UTRAN FDD – UTRAN FDD Measurement reporting requirements	8.3.0	8.4.0
2008-12	RP#42	RP-080933	58		Measurement requirement for E-UTRAN TDD to UTRAN TDD/FDD when DRX is used	8.3.0	8.4.0
2008-12	RP#42	RP-080933	60		Interfrequency and GSM measurement performance requirements in large DRX	8.3.0	8.4.0
2008-12	RP#42	RP-080933	62		Correction of implementation margin for transmission gap.	8.3.0	8.4.0
2008-12	RP#42	RP-080933	72		Alignement of DRX cycle dependent requirements	8.3.0	8.4.0
2008-12	RP#42	RP-080933	73	1	Alignement of side conditions for mobility measurements	8.3.0	8.4.0
2008-12	RP#42	RP-080933	66	1	Measurement models in RRC_CONNECTED	8.3.0	8.4.0
2008-12	RP#42	RP-080933	78	1	Limitation of maximum number of layers for multiple monitoring	8.3.0	8.4.0
2008-12	RP#42	RP-080933	83	1	GSM Cell identification requirements for parallel monitoring	8.3.0	8.4.0
2008-12	RP#42	RP-080933	87		UE transmit timing requirement	8.3.0	8.4.0
2008-12	RP#42	RP-080933	56		Correction of TS 36.133 section 8.1.2.1.1.	8.3.0	8.4.0

2008-12	RP#42	RP-080934	77		Correction to RSRQ Report Mapping	8.3.0	8.4.0
2008-12	RP#42		86		Missing side conditions for RSRP and RSRQ	8.3.0	8.4.0
2008-12	RP#42	RP-080935	81	1	Phase I RRM Test Cases	8.3.0	8.4.0
2008-12	RP#42		80	1	Test Configuration for RRM Tests: Measurement Reference Channels and OCNG	8.3.0	8.4.0
2008-12	RP#42	RP-080936	75		Cdma200 1xRTT Measurement Requirements	8.3.0	8.4.0
2008-12	RP#42	RP-080937	74	1	E-UTRA to UTRA cell search requirements for SON	8.3.0	8.4.0
2009-03	RP#43	RP-090182	101	1	Correction of A3-offset parameter in RRM test case	8.4.0	8.5.0
2009-03	RP#43	RP-090182	105		Some Editorial Corrections	8.4.0	8.5.0
2009-03	RP#43	RP-090182	145		Clarifications for the DRX state	8.4.0	8.5.0
2009-03	RP#43	RP-090183	89		Modification on measurements of UTRAN TDD cells	8.4.0	8.5.0
2009-03	RP#43	RP-090183	91		Clarification of the correct behavior when Treselection is not a multiple of idle mode reselection evaluation period	8.4.0	8.5.0
2009-03	RP#43	RP-090183	98		Clarification of 'Out of Service Area' Concept and Definition	8.4.0	8.5.0
2009-03	RP#43	RP-090183	118		Radio link monitoring	8.4.0	8.5.0
2009-03	RP#43	RP-090183	142	1	Update of RRC_IDLE state mobility side conditions	8.4.0	8.5.0
2009-03	RP#43	RP-090183	150		UE measurement capability in Idle mode	8.4.0	8.5.0
2009-03	RP#43	RP-090184	133		Removal of RRC re-establishment procedure delay	8.4.0	8.5.0
2009-03	RP#43	RP-090184	138	1	Correction for the UE Re-establishment delay requirement	8.4.0	8.5.0
2009-03	RP#43	RP-090185	92	2	Cell phase synchronization accuracy	8.4.0	8.5.0
2009-03	RP#43	RP-090185	97		Radio link monitoring in DRX	8.4.0	8.5.0
2009-03	RP#43	RP-090185	120		UE Transmit Timing	8.4.0	8.5.0
2009-03	RP#43	RP-090185	137	1	Clarification of the reference point for the UE initial transmission timing control requirement	8.4.0	8.5.0
2009-03	RP#43	RP-090186	90		Correction of section 8.1.2.2.2.2 in TS36.133	8.4.0	8.5.0
2009-03	RP#43	RP-090186	93	1	cdma2000 1xRTT and HRPD Measurement Requirements	8.4.0	8.5.0
2009-03	RP#43	RP-090186	94		Event Triggered Periodic Reporting Requirements for IRAT Measurements	8.4.0	8.5.0
2009-03	RP#43	RP-090186	95		Measurement Reporting Requirements for E-UTRAN TDD – UTRAN TDD Measurements	8.4.0	8.5.0
2009-03	RP#43	RP-090186	99	1	Clarification of UE behavior when measurement gap is used	8.4.0	8.5.0
2009-03	RP#43	RP-090186	100		E-UTRA to UTRA cell search requirements in DRX for SON	8.4.0	8.5.0
2009-03	RP#43	RP-090186	110	1	Correction to GSM BSIC Requirements for Parallel Monitoring	8.4.0	8.5.0
2009-03	RP#43	RP-090186	117		Alignment of terminology for GAP	8.4.0	8.5.0
2009-03	RP#43	RP-090186	134		Inter frequency and Inter RAT cell search requirement when DRX is used	8.4.0	8.5.0
2009-03	RP#43	RP-090186	139		Correction of E-UTRAN FDD – UTRAN FDD measurements when no DRX	8.4.0	8.5.0
2009-03	RP#43	RP-090186	146		Addition of the definition of "when DRX is used"	8.4.0	8.5.0
2009-03	RP#43	RP-090186	147	1	Corrections to E-UTRAN inter-frequency side conditions	8.4.0	8.5.0
2009-03	RP#43	RP-090187	96		Correction to Intra-frequency RSRP Accuracy Requirements	8.4.0	8.5.0
2009-03	RP#43	RP-090187	136	1	Power Headroom reporting delay	8.4.0	8.5.0
2009-03	RP#43	RP-090370	103	1	E-UTRAN -GSM Handover Test Case	8.4.0	8.5.0
2009-03	RP#43	RP-090370	104	1	E-UTRAN FDD - UTRAN TDD Cell Search Test Cases in Fading	8.4.0	8.5.0
2009-03	RP#43	RP-090370	106	1	E-UTRA FDD to UTRA FDD Handover Test Case	8.4.0	8.5.0
2009-03	RP#43	RP-090370	107	1	Correction of E-UTRA FDD-FDD Intra-frequency cell reselection test case	8.4.0	8.5.0
2009-03	RP#43	RP-090370	108	1	Correction of E-UTRA FDD-FDD priority based Inter-frequency cell reselection test case	8.4.0	8.5.0
2009-03	RP#43	RP-090370	111		E-UTRAN TDD - UTRAN FDD Handover Test Case	8.4.0	8.5.0
2009-03	RP#43	RP-090370	112	1	E-UTRAN FDD - GSM Cell Search Test Case in AWGN	8.4.0	8.5.0
2009-03	RP#43	RP-090370	113		E-UTRAN - UTRAN FDD Cell Search Test Cases in Fading	8.4.0	8.5.0
2009-03	RP#43	RP-090370	114	1	E-UTRAN UE Timing Accuracy Related Test Cases	8.4.0	8.5.0
2009-03	RP#43	RP-090370	115	1	Inclusion of MBSFN Configurations for RRM Test Cases	8.4.0	8.5.0
2009-03	RP#43	RP-090370	116		E-UTRAN FDD HRPD Cell Reselection Test Case; HRPD of Low Priority	8.4.0	8.5.0

2009-03	RP#43	RP-090370	122	1	Clarification on Annex A.9: Measurement performance requirements	8.4.0	8.5.0
2009-03	RP#43	RP-090370	125		E-UTRA TDD – UTRA TDD cell reselection: UTRA is of higher priority	8.4.0	8.5.0
2009-03	RP#43	RP-090370	126		E-UTRA TDD – UTRA TDD cell reselection: UTRA is of lower priority	8.4.0	8.5.0
2009-03	RP#43	RP-090370	127		E-UTRA FDD – UTRA TDD cell reselection	8.4.0	8.5.0
2009-03	RP#43	RP-090370	128	1	E-UTRA TDD-UTRA TDD cell search (fading)	8.4.0	8.5.0
2009-03	RP#43	RP-090370	129	1	E-UTRA TDD-UTRA TDD handover	8.4.0	8.5.0
2009-03	RP#43	RP-090370	132	1	Addition of E-UTRA FDD to UTRA FDD reselection test cases	8.4.0	8.5.0
2009-03	RP#43	RP-090370	141	1	Correction and introduction of some test related parameters	8.4.0	8.5.0
2009-03	RP#43	RP-090370	143		Description of Annex A in TS 36.133	8.4.0	8.5.0
2009-03	RP#43	RP-090370	148		Reselection from E-UTRA to GSM cell test case	8.4.0	8.5.0
2009-03	RP#43	RP-090370	149		Radio Link Monitoring Test Cases	8.4.0	8.5.0
2009-05	RP#44	RP-090546	151		E-UTRA FDD UTRA TDD HO delay test case	8.5.0	8.6.0
2009-05	RP#44	RP-090546	153		Correction of CQI reporting periodicity for TDD RLM test cases	8.5.0	8.6.0
2009-05	RP#44	RP-090546	157		Correction to inter RAT reselection requirements to exclude equal priority. (Technically Endorsed CR in R4-50bis - R4-091092)	8.5.0	8.6.0
2009-05	RP#44	RP-090546	167		Clarification of the number of monitoring carriers in idle mode. (Technically Endorsed CR in R4-50bis - R4-091394)	8.5.0	8.6.0
2009-05	RP#44	RP-090546	180		Correction of Core spec references in A.9 Measurements performance test cases	8.5.0	8.6.0
2009-05	RP#44	RP-090546	984		UTRA FDD-E-UTRA FDD/ TDD handover test cases	8.5.0	8.6.0
2009-05	RP#44	RP-090546	184		SON ANR UTRAN FDD Cell Search Test Case	8.5.0	8.6.0
2009-05	RP#44	RP-090546	187		E-UTRAN FDD cdma2000 1x RTT Cell Reselection Test Case; Cdma2000 1X of Low Priority	8.5.0	8.6.0
2009-05	RP#44	RP-090546	188		E-UTRAN FDD cdma2000 HO Test cases	8.5.0	8.6.0
2009-05	RP#44	RP-090546	190		E-UTRAN Random Access Test Cases	8.5.0	8.6.0
2009-05	RP#44	RP-090546	191		E-UTRAN RRC Re-establishment Test Cases	8.5.0	8.6.0
2009-05	RP#44	RP-090546	192		E-UTRAN TDD - GSM Cell Search Test Case in AWGN	8.5.0	8.6.0
2009-05	RP#44	RP-090546	197		Correction to E-UTRAN FDD - GSM Handover Test case	8.5.0	8.6.0
2009-05	RP#44	RP-090546	173	1	Correction of cell reselection test cases	8.5.0	8.6.0
2009-05	RP#44	RP-090546	179	1	Test cases of E-UTRA TDD intra-frequency cell search in fading environment when DRX is used	8.5.0	8.6.0
2009-05	RP#44	RP-090546	152	1	E-UTRA TDD GSM handover test case	8.5.0	8.6.0
2009-05	RP#44	RP-090546	178	1	Test cases of E-UTRA FDD intra-frequency cell search in fading environment when DRX is used	8.5.0	8.6.0
2009-05	RP#44	RP-090546	201	1	Test case for E-UTRA FDD E-UTRA FDD inter frequency cell search when DRX is used in fading conditions	8.5.0	8.6.0
2009-05	RP#44	RP-090546	185	1	Correction to Radio Link Monitoring Tests	8.5.0	8.6.0
2009-05	RP#44	RP-090546	203		Correction to E-UTRAN FDD to HRPD Cell Reselection Test Case	8.5.0	8.6.0
2009-05	RP#44	RP-090546	177	1	Introduction of New Reference Channels and OCNG Patterns for 1.4MHz Bandwidth	8.5.0	8.6.0
2009-05	RP#44	RP-090546	200	2	Test case for E-UTRA TDD E-UTRA TDD inter frequency cell search when DRX is used in fading conditions	8.5.0	8.6.0
2009-05	RP#44	RP-090547	158		Alignment of inter frequency and inter RAT RRM reselection testcases with core requirements. (Technically Endorsed CR in R4-50bis - R4-091094)	8.5.0	8.6.0
2009-05	RP#44	RP-090547	160		Correction relating E-UTRAN TDD - UE Transmit Timing Accuracy Tests. (Technically Endorsed CR in R4-50bis - R4-091198)	8.5.0	8.6.0
2009-05	RP#44	RP-090547	165		Modifications of T3 and the verification point for in-sync test cases. (Technically Endorsed CR in R4-50bis - R4-091386)	8.5.0	8.6.0
2009-05	RP#44	RP-090547	172		E-UTRAN UE Timing Accuracy Related Test Cases. (Technically Endorsed CR in R4-50bis - R4-091517)	8.5.0	8.6.0
2009-05	RP#44	RP-090547	171	1	Reference measurement Channels for Radio Link Monitoring Tests with 2 Antennas. (Technically Endorsed CR in R4-50bis - R4-091508)	8.5.0	8.6.0
2009-05	RP#44	RP-090548	170		Misalignment between TS36.133 and TS36.321. (Technically Endorsed CR in R4-50bis - R4-091457)	8.5.0	8.6.0
2009-05	RP#44	RP-090548	193		Correction to Inter-RAT HO Interruption Time Definition	8.5.0	8.6.0
2009-05	RP#44	RP-090548	195		CR c2k RRC delay	8.5.0	8.6.0
2009-05	RP#44	RP-090548	196		CR c2k interruption time	8.5.0	8.6.0
2009-05	RP#44	RP-090548	162		Clarifications to UE UL timing requirements. (Technically Endorsed CR in R4-50bis - R4-091357)	8.5.0	8.6.0
2009-05	RP#44	RP-090548	176		Corrections of Random Access Requirements	8.5.0	8.6.0
2009-05	RP#44	RP-090548	154		Correction of TGRP in clause 8.1.2.1.1	8.5.0	8.6.0
2009-05	RP#44	RP-090548	168		Clarifications for the Relative RSRP and RSRQ measurement requirements. (Technically Endorsed CR in R4-50bis - R4-091407)	8.5.0	8.6.0
2009-05	RP#44	RP-090549	161		E-UTRAN UTRAN HO Command Processing Delay. (Technically Endorsed CR in R4-50bis - R4-091291)	8.5.0	8.6.0
2009-05	RP#44	RP-090549	175		Corrections of Cell Reselection Requirements in Idle Mode	8.5.0	8.6.0

2009-05	RP#44	RP-090549	181	2	Removal of [ ] from ranking criteria in Idle mode cell reselection	8.5.0	8.6.0
2009-05	RP#44	RP-090550	156		Correction on the TDD-TDD inter frequency measurements. (Technically Endorsed CR in R4-50bis - R4-091071)	8.5.0	8.6.0
2009-05	RP#44	RP-090550	159		Correction to the Referenced Section Number for Tinter1. (Technically Endorsed CR in R4-50bis - R4-091153)	8.5.0	8.6.0
2009-05	RP#44	RP-090551	166		Further clarification of DRX/Non-DRX state. (Technically Endorsed CR in R4-50bis - R4-091389)	8.5.0	8.6.0
2009-05	RP#44	RP-090551	202		Correction on reference to 3GPP2 specification	8.5.0	8.6.0
2009-05	RP#44	RP-090551	169		OCNG simplification. (Technically Endorsed CR in R4-50bis - R4-091410)	8.5.0	8.6.0
2009-09	RP#45	RP-090817	210		Correction to TDD RMC references in RLM test cases	8.6.0	8.7.0
2009-09	RP#45	RP-090880	204		Introduction of Reference DRX configurations	8.6.0	8.7.0
2009-09	RP#45	RP-090880	206		Addition of DRX configurations into non DRX test cases	8.6.0	8.7.0
2009-09	RP#45	RP-090880	224		Correction to HO Test Cases	8.6.0	8.7.0
2009-09	RP#45	RP-090880	226		Correction to E-UTRAN GSM BSIC Identification Requirements with DRX	8.6.0	8.7.0
2009-09	RP#45	RP-090880	258		Corrections of Test Cases	8.6.0	8.7.0
2009-09	RP#45	RP-090880	306		E-UTRA FDD - E-UTRA FDD and UTRA FDD cell search test cases	8.6.0	8.7.0
2009-09	RP#45	RP-090880	307		E-UTRAN Radio Link Monitoring Test Cases in DRX	8.6.0	8.7.0
2009-09	RP#45	RP-090880	308	1	Inter-frequency E-UTRA - E-UTRA HO test cases: unknown target cell	8.6.0	8.7.0
2009-09	RP#45	RP-090880	262	1	E-UTRA FDD UTRA FDD Blind Handover test case: unknown target cell	8.6.0	8.7.0
2009-09	RP#45	RP-090836	320		Small corrections to Measurements performance tests parameters	8.6.0	8.7.0
2009-09	RP#45	RP-090836	284	1	E-UTRAN GSM Cell Search in DRX Test Cases	8.6.0	8.7.0
2009-09	RP#45	RP-090836	266		Set 3.2. E-UTRA TDD to UTRA TDD cell search in DRX under fading	8.6.0	8.7.0
2009-09	RP#45	RP-090836	268		Set 3.6. Test case of E-UTRA TDD to E-UTRA TDD and UTRA TDD combined cell search under fading	8.6.0	8.7.0
2009-09	RP#45	RP-090836	270		Set 3.12. E-UTRA TDD to UTRA TDD blind handover test	8.6.0	8.7.0
2009-09	RP#45	RP-090836	278		E-UTRAN FDD - UTRAN FDD Cell Search in DRX Test Cases	8.6.0	8.7.0
2009-09	RP#45	RP-090836	280		E-UTRAN TDD- E-UTRAN TDD and E-UTRAN TDD Inter-frequency Cell Search Test Case	8.6.0	8.7.0
2009-09	RP#45	RP-090836	282		E-UTRAN GSM Blind Handover Test Cases	8.6.0	8.7.0
2009-09	RP#45	RP-090836	286		E-UTRAN FDD cdma2000 Blind HO Test cases	8.6.0	8.7.0
2009-09	RP#45	RP-090836	301		RRM Test case for multiple E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions	8.6.0	8.7.0
2009-09	RP#45	RP-090836	303		Fading reselection test case between E-UTRA and UTRA	8.6.0	8.7.0
2009-09	RP#45	RP-090828	232		CR SI HRPD correction	8.6.0	8.7.0
2009-09	RP#45	RP-090879	214	1	Corrections to Measurements of HRPD cells and cdma2000 1X	8.6.0	8.7.0
2009-09	RP#45	RP-090879	216	1	Corrections to E-UTRAN RRC_IDLE state mobility requirements	8.6.0	8.7.0
2009-09	RP#45	RP-090879	230		CR reference correction	8.6.0	8.7.0
2009-09	RP#45	RP-090879	234	1	Corrections to Measurements of GSM cells in RRC_IDLE	8.6.0	8.7.0
2009-09	RP#45	RP-090879	246		Range of Idle Mode Es/Iot side conditions	8.6.0	8.7.0
2009-09	RP#45	RP-090879	248		Removal of [ ] from Tdetect, Tmeasure and Tevaluate	8.6.0	8.7.0
2009-09	RP#45	RP-090879	298		CR Idle mode IF measurement condition	8.6.0	8.7.0
2009-09	RP#45	RP-090879	299		CR Idle mode IF measurement period	8.6.0	8.7.0
2009-09	RP#45	RP-090879	244	1	Clarification to applicability of RSRP side conditions in Idle mode	8.6.0	8.7.0
2009-09	RP#45	RP-090814	264	1	Correction to Random Access	8.6.0	8.7.0
2009-09	RP#45	RP-090816	212		Editorial correction on E-UTRAN inter frequency measurements	8.6.0	8.7.0
2009-09	RP#45	RP-090816	218		E-UTRAN FDD-FDD inter frequency measurements when DRX is used	8.6.0	8.7.0
2009-09	RP#45	RP-090816	220		E-UTRAN TDD-TDD inter frequency cell search/measurement requirements when DRX is used	8.6.0	8.7.0
2009-09	RP#45	RP-090816	222		E-UTRAN inter RAT measurement requirements	8.6.0	8.7.0
2009-09	RP#45	RP-090816	228		Correction to Monitoring of Multiple Layers Using Gaps	8.6.0	8.7.0
2009-09	RP#45	RP-090816	294		CR GSM measurement period	8.6.0	8.7.0
2009-09	RP#45	RP-090816	295		CR cdma2000 1x and HRPD number of carriers	8.6.0	8.7.0
2009-09	RP#45	RP-090816	260	1	E-UTRAN TDD intra frequency measurements	8.6.0	8.7.0
2009-09	RP#45	RP-090816	300	2	Clarification of the number of monitoring cells for intra frequency measurements	8.6.0	8.7.0
2009-09	RP#45	RP-090815	236		Correction of timing advance adjustment accuracy test case	8.6.0	8.7.0
2009-09	RP#45	RP-090815	290		Correction to UE Transmit Timing Requirements	8.6.0	8.7.0
2009-12	RP#46	RP-091275	328		Defining requirements for UTRA TDD measurements for SON (Technically endorsed at RAN 4 52bis in R4-093511)	8.7.0	8.8.0
2009-12	RP#46	RP-091272	330		Modification of test case of E-UTRA TDD intra frequency cell reselection (Technically endorsed at RAN 4 52bis in R4-093520)	8.7.0	8.8.0
2009-12	RP#46	RP-091272	331		Modification of test case of E-UTRA TDD inter frequency cell reselection (Technically endorsed at RAN 4 52bis in R4-093521)	8.7.0	8.8.0
2009-12	RP#46	RP-091272	335		Addition of E-UTRA TDD to UTRA FDD reselection test cases (Technically endorsed at RAN 4 52bis in R4-093686)	8.7.0	8.8.0
2009-12	RP#46	RP-091271	337		Correction of missing accuracy requirements for UTRAN FDD	8.7.0	8.8.0

					(Technically endorsed at RAN 4 52bis in R4-093689)		

2009-12	RP#46	RP-091275	339		CR cdma2000 HRPD measurement period (Technically endorsed at RAN 4 52bis in R4-093720)	8.7.0	8.8.0
2009-12	RP#46	RP-091275	341		CR cdma2000 1x measurement period (Technically endorsed at RAN 4 52bis in R4-093721)	8.7.0	8.8.0
2009-12	RP#46	RP-091272	343		Correction for E-UTRAN FDD - UTRAN FDD Cell Search in DRX Test Cases (Technically endorsed at RAN 4 52bis in R4-093890)	8.7.0	8.8.0
2009-12	RP#46	RP-091272	345		Revise geometry factors for Intra freq Reselection Test Cases	8.7.0	8.8.0
2009-12	RP#46	RP-091271	347		Corrections on RRM parameters for Bands 12, 14, 17	8.7.0	8.8.0
2009-12	RP#46	RP-091271	350	1	Corrections to PDSCH RMC-s	8.7.0	8.8.0
2009-12	RP#46	RP-091271	352		Corrections of TS36.133	8.7.0	8.8.0
2009-12	RP#46	RP-091275	357		E-UTRAN TDD - UTRAN TDD cell search for SON	8.7.0	8.8.0
2009-12	RP#46	RP-091275	360		Cell Search Requirements for Intra-LTE Handover to Unknown Target Cell	8.7.0	8.8.0
2009-12	RP#46	RP-091271	366	1	Correction in UE UTRA TDD P-CCPCH RSCP measurement capability for R8	8.7.0	8.8.0
2009-12	RP#46	RP-091275	377		Cell Timing Change Requirements for Event Triggered Reporting	8.7.0	8.8.0
2009-12	RP#46	RP-091271	379		Correction to Power Headroom Requirements	8.7.0	8.8.0
2009-12	RP#46	RP-091271	381		Editorial corrections to 36.133	8.7.0	8.8.0
2009-12	RP#46	RP-091271	386		Editorial corrections to the time units for RRC Re-establishment test cases	8.7.0	8.8.0
2009-12	RP#46	RP-091272	388	1	Introduction of cell search test case in DRX to verify L3 filtering	8.7.0	8.8.0
2009-12	RP#46	RP-091271	390		Correction to ONCG Patterns	8.7.0	8.8.0
2009-12	RP#46	RP-091287	392		Correction of Band 11 requirements for TS36.133 Rel-8	8.7.0	8.8.0
2010-03	RP#47	RP-100254	409		Idle mode corrections	8.8.0	8.9.0
2010-03	RP#47	RP-100254	404	1	UE measurement capability requirements in Idle and Connected	8.8.0	8.9.0
2010-03	RP#47	RP-100254	422		Correction to UE Measurement Capability Requirements in Idle Mode	8.8.0	8.9.0
2010-03	RP#47	RP-100254	411		Removal of activation time from interRAT handover requirements	8.8.0	8.9.0
2010-03	RP#47	RP-100254	416	1	Correction to UE Transmit Timing Requirements	8.8.0	8.9.0
2010-03	RP#47	RP-100254	400		Correction of E-UTRAN FDD inter frequency measurements	8.8.0	8.9.0
2010-03	RP#47	RP-100254	401		Correction of E-UTRAN TDD inter frequency measurements_R8	8.8.0	8.9.0
2010-03	RP#47	RP-100255	398		Correction of RSRP value in E-UTRAN FDDFDD Inter frequency reselection test	8.8.0	8.9.0
2010-03	RP#47	RP-100255	396		Addition of missing Es/Noc parameters in RRM test cases	8.8.0	8.9.0
2010-03	RP#47	RP-100255	420		Correction to RRC Re-establishment Test Case	8.8.0	8.9.0
2010-03	RP#47	RP-100255	426		Correction of UE transmit timing test case	8.8.0	8.9.0
2010-03	RP#47	RP-100255	418	1	Correction to RLM Test Cases	8.8.0	8.9.0
2010-03	RP#47	RP-100262	406		Editorial Corrections in TS36.133(Rel-8)	8.8.0	8.9.0
2010-03	RP#47	RP-100264	394		Corrections for Extended UMTS1500 in TS36.133(Rel-8)	8.8.0	8.9.0
2010-06	RP-48	RP-100622	465	1	Correction to RRM Test Cases	8.9.0	8.10.0
2010-06	RP-48	RP-100622	471		Corrections of section numbering on the test case of E-UTRAN FDD-FDD inter-frequency cell search requirements for L3 fitering	8.9.0	8.10.0
2010-06	RP-48	RP-100622	463	1	Correction to RRM Requirements	8.9.0	8.10.0
2010-06	RP-48	RP-100622	456		UE Measurement Capability Requirements for CDMA2000	8.9.0	8.10.0
2010-06	RP-48	RP-100622	452		Clarification on radio link monitoring	8.9.0	8.10.0
2010-06	RP-48	RP-100622	448	1	Editorial corrections to 36.133(Rel-8)	8.9.0	8.10.0
2010-06	RP-48	RP-100622	446		Correction to TDD intrafrequency accuracy test case	8.9.0	8.10.0
2010-06	RP-48	RP-100622	440	1	Correction of Io value in E-UTRAN FDD and TDD Inter frequency RSRP tests	8.9.0	8.10.0
2010-06	RP-48	RP-100622	454	1	Correction of E-UTRAN Inter-frequency Cell Re-selection Requirements	8.9.0	8.10.0
2010-09	RP-49	RP-100914	482		Clarification of Radio link monitoring test cases	8.10.0	8.11.0
2010-09	RP-49	RP-100914	476	1	Cell identity change time in RRM Test cases	8.10.0	8.11.0
2010-09	RP-49	RP-100915	507		Correction of Io value in RSRP FDD and TDD Intra frequency test	8.10.0	8.11.0
2010-09	RP-49	RP-100914	522		Alignment of REFSENS between 36.101 and 36.133(R8)	8.10.0	8.11.0
2010-09	RP-49	RP-100914	548		Introduction of CSG cell reselection requirements	8.10.0	8.11.0
2010-09	RP-49	RP-100914	478	1	Scrambling code change time in RRM Test cases	8.10.0	8.11.0
2010-09	RP-49	RP-100915	484		Test case for E-UTRA TDD event triggered reporting when L3 filtering is used in R8	8.10.0	8.11.0
2010-09	RP-49	RP-100915	504	1	Corrections to 36.133(R8)	8.10.0	8.11.0
2010-09	RP-49	RP-100915	493		PDCCH Aggregation level for RRM tests	8.10.0	8.11.0
2010-09	RP-49	RP-100915	500		Correction of OCNG	8.10.0	8.11.0
2010-09	RP-49	RP-100915	502		Correction of ES/Iot value in E-UTRAN RSRQ FDD intra frequency test	8.10.0	8.11.0
2010-09	RP-49	RP-100915	495		Corrections to RRM OCNG Patterns	8.10.0	8.11.0
2010-09	RP-49	RP-100915	486		E-UTRA TDD - UTRA TDD cell reselection in fading propagation conditions: UTRA TDD is of lower priority in R8	8.10.0	8.11.0
2010-12	RP-50	RP-101331	633		Corrections to 36.133 performance requirements	8.11.0	8.12.0
2010-12	RP-50	RP-101331	636		Correction to intra frequency cell identification time	8.11.0	8.12.0
2010-12	RP-50	RP-101331	590	1	Correction to Radio link monitoring test cases	8.11.0	8.12.0

2010-12	RP-50	RP-101331	564	1	Corrections and Clarifications to TS36.133	8.11.0	8.12.0
2010-12	RP-50	RP-101332	561		PDCCH Aggregation Level for RRM Tests	8.11.0	8.12.0
2010-12	RP-50	RP-101332	569		MIMO correlation scenario for RLM test cases	8.11.0	8.12.0
2010-12	RP-50	RP-101332	578		Removal of [ ] from PDSCH and PCFICH/PDCCH/PHICH Measurement Channel references in Annex A.	8.11.0	8.12.0
2010-12	RP-50	RP-101332	583		Enabling HARQ for RRM Tests	8.11.0	8.12.0
2010-12	RP-50	RP-101335	641	1	Completion of CSG cell reselection requirements	8.11.0	8.12.0
2010-12	RP-50	RP-101386	646		Removal of square brackets from scope of TS36.133	8.11.0	8.12.0
2011-04	RP-51	RP-110340	0661	-	Correction to E-UTRAN TDD in-sync test requirements	8.12.0	8.13.0
2011-04	RP-51	RP-110339	0674	-	Modification on test case of E-UTRA TDD to UTRA TDD cell reselection(R8)	8.12.0	8.13.0
2011-04	RP-51	RP-110339	0679	1	Value of MS_TXPWR_MAX_CCH for EUTRA-GSM reselection test cases A.4.4.x	8.12.0	8.13.0
2011-04	RP-51	RP-110339	0685	1	Rearrangement of Time periods for EUTRA-UTRA reselection test case A.4.3.1.1	8.12.0	8.13.0
2011-04	RP-51	RP-110339	0688	1	Removal of "Force to Cell 2" during initialisation for EUTRA-UTRA reselection test case A.4.3.1.2	8.12.0	8.13.0
2011-04	RP-51	RP-110340	0691	1	SNR for RRM A.8.x test cases using ETU70	8.12.0	8.13.0
2011-04	RP-51	RP-110339	0701	-	Correction to test cases of E-UTRA to UTRA cell reselection when UE is in idle state	8.12.0	8.13.0
2011-04	RP-51	RP-110339	0717	1	Modification on Test Requirements in E-UTRA - UTRA TDD SON Test Case (A.8.7.3) (R8)	8.12.0	8.13.0
2011-04	RP-51	RP-110340	0734	-	Correction of RLM evaluation period in DRX	8.12.0	8.13.0
2011-04	RP-51	RP-110340	0737	-	Correction of inter-frequency measurement accuracy test cases	8.12.0	8.13.0
2011-04	RP-51	RP-110339	0742	-	Modification on Test Requirements in E-UTRA GSM cell reselection Test Case (A.4.4) (R8)	8.12.0	8.13.0
2011-06	RP-52	RP-110786	763		Rearrangement of Time periods for EUTRA-UTRA reselection test case A.4.3.4.1	8.13.0	8.14.0
2011-06	RP-52	RP-110786	766		Removal of "Force to Cell 2" during initialisation for EUTRA - UTRA reselection test cases	8.13.0	8.14.0
2011-06	RP-52	RP-110787	769		Clarification of Radio link monitoring test requirements	8.13.0	8.14.0
2011-06	RP-52	RP-110786	812		Correction to inter-RAT cell identificiation time in DRX for Rel-8	8.13.0	8.14.0
2011-06	RP-52	RP-110787	815		Correction to identification time of UTRA FDD cell for SON in DRX for Rel-8	8.13.0	8.14.0
2011-06	RP-52	RP-110787	820		Correction to requirements of E-UTRAN TDDUTRAN TDD measurements for SON when DRX is used for Rel-8	8.13.0	8.14.0
2011-06	RP-52	RP-110787	826	1	Addition of missing EsNoc parameters in E-UTRAN TDD UTRAN TDD Measurements test cases for Rel-8	8.13.0	8.14.0
2011-09	RP-53	RP-111246	861		Thresholds and margins for reporting of neighbour cells in RRM test A.8.9.1	8.14.0	8.15.0
2011-09	RP-53	RP-111246	900		Thresholds and margins for RRM tests A.5.2.1 and A.5.2.2	8.14.0	8.15.0
2011-09	RP-53	RP-111246	903		Thresholds and margins for RRM tests A.5.2.4 and A.5.2.5	8.14.0	8.15.0
2011-09	RP-53	RP-111247	886		Adding condition of UTRA TDD measurement report delay requirements applied	8.14.0	8.15.0
2011-09	RP-53	RP-111247	887		Removing [] in section 8.1.2.2.2.2 for Rel-8	8.14.0	8.15.0
2011-09	RP-53	RP-111247	928		Clarify time points and time duration for RLM tests A.7.3.x	8.14.0	8.15.0
2011-09	RP-53	RP-111250	947	1	Correction of references	8.14.0	8.15.0
2011-09	RP-53	RP-111250	958		Missing RSRQ in Intra-frequency measurement requirements	8.14.0	8.15.0
2011-12	RP-54	RP-111681	980		Corrections of inter-frequency measurement accuracy RSRP test cases	8.15.0	8.16.0
2011-12	RP-54	RP-111681	1029		Correction for the identification time in DRX for UTRA TDD in R8	8.15.0	8.16.0
2011-12	RP-54	RP-111680	1036		Thresholds and margins for RRM tests A.8.11.3 and A.8.11.4	8.15.0	8.16.0
2011-12	RP-54	RP-111681	1037	1	Correction of E-UTRAN TDD-TDD inter frequency handover test case in R8	8.15.0	8.16.0
2012-03	RP-55	RP-120291	1082		Thresholds and margins for E-UTRAN to C2K RRM reselection test cases (Rel-8)	8.16.0	8.17.0
2012-03	RP-55	RP-120292	1116	1	Thresholds and margins in RRM test case A.8.11.4	8.16.0	8.17.0
2012-03	RP-55	RP-120292	1119		TDD PRACH Test cases value of PRACH Configuration Index and first preamble power	8.16.0	8.17.0
2012-03	RP-55	RP-120292	1122	1	PDSCH and OCNG pattern in PRACH Test cases A.6.2.1 and A.6.2.3	8.16.0	8.17.0

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